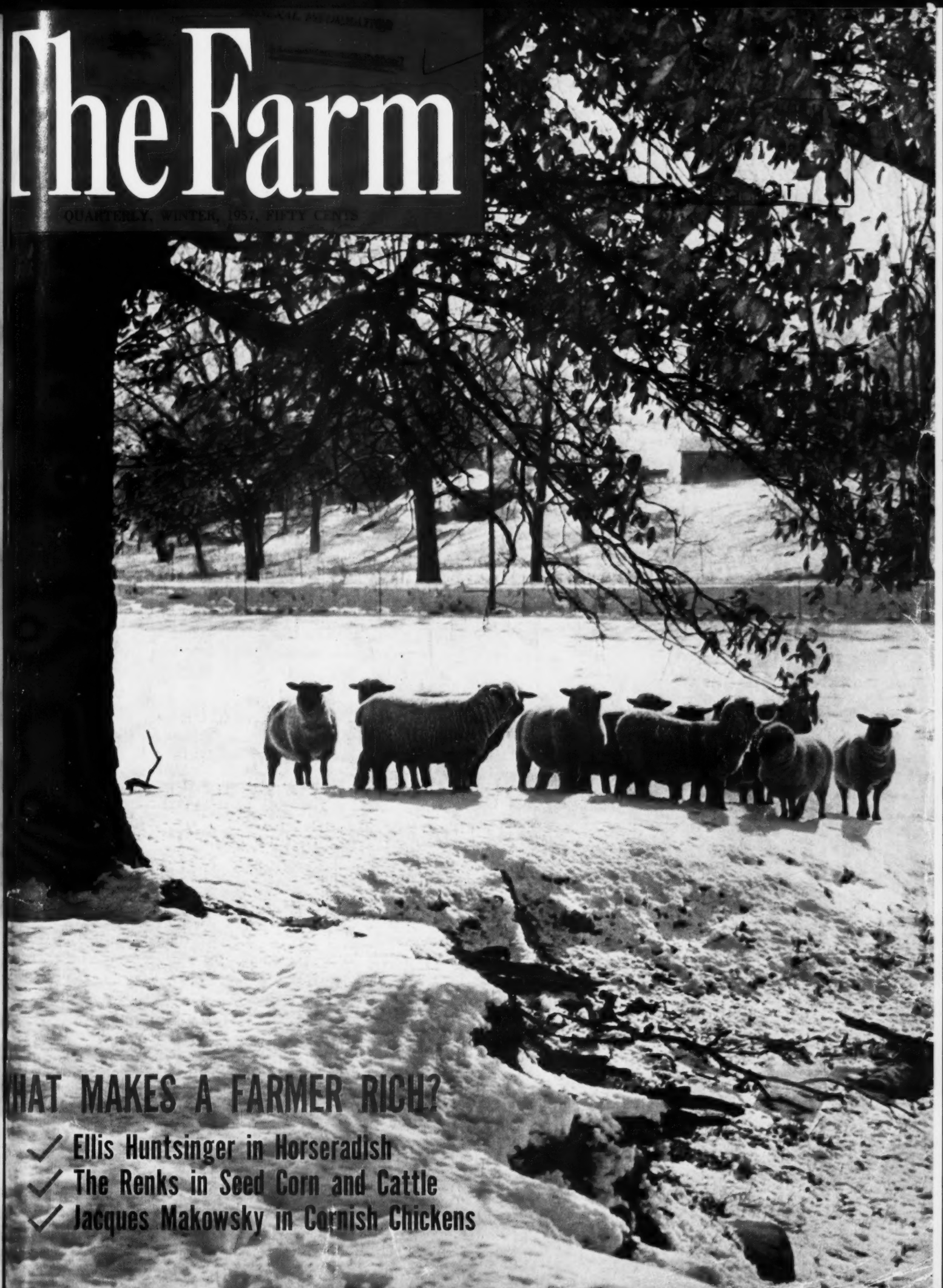
The Farm

QUARTERLY, WINTER, 1957, FIFTY CENTS



WHAT MAKES A FARMER RICH?

- ✓ Ellis Huntsinger in Horseradish
- ✓ The Renks in Seed Corn and Cattle
- ✓ Jacques Makowsky in Cornish Chickens

How Scraping Cattle Pens is Speeded by Wedge-*in* Action—

See why Super-Sure-Grip does more work faster, lowers tire costs—

LONGER, RULER-STRAIGHT LUGS give you more traction area—and because they come *closer together at shoulders* (A) they take *"wedge-in"* bites that *firm* loose footing, deliver the most powerful go-ahead pull.

O-P-E-N C-E-N-T-E-R helps self-cleaning, longer, *ruler-straight* lugs bite deeper, pull better.

GREATER AIR-VOLUME for more flexibility and better ground contact. This also means an easier ride and greater load capacity.

LONG, EVEN WEAR—longer, *ruler-straight* lugs work evenly against soil, roll smoothly on road—and so wear slowly and evenly!

STRONGER BODY gives you added protection against bruise-breaks and the wear and tear of long, tough service. Goodyear, Farm Tire Dept., Akron 16, Ohio.

Super-Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

This slippery, trampled, insecure footing can cause even the deepest-lugged tires to lose traction, spin helplessly.

That's where Super-Sure-Grip lugs give you a big advantage. They're "ANGLE-ENGINEERED" to *find* a grip—*hold* that grip in a pull-packed squeeze—and deliver astounding traction practically anywhere!

The secret is that, unlike imitations, Goodyear lugs are *ruler-straight* and closer together *at the tire's shoulders*. This starts a powerful *"wedge-in"* action, builds positive go-ahead traction, *boosts* you through the toughest farm jobs! No wonder all surveys show—

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ALL OTHER MAKES *PUT TOGETHER!*

Look for this nearby Goodyear dealer sign for better tire values—better tire care. Convenient credit terms.

GOODYEAR

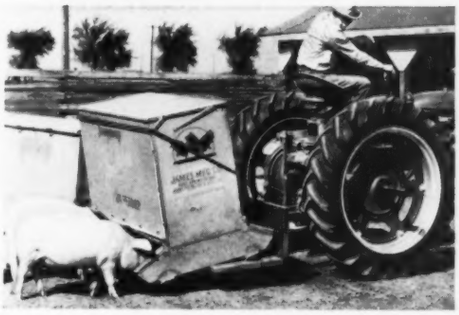
Super-Sure-Grip Tractor Tires

Get manure out fast with a McCormick U-34A power loader and a pto-driven No. 40 spreader. There's McCormick manure handling equipment sized to fit your needs exactly.

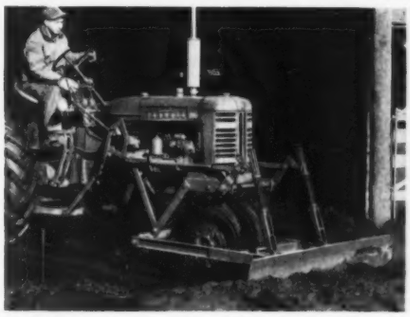
"Power-Away" your barnyard chores

...the job-easy McCORMICK® way

Now, bring field-work ease and efficiency to your barnyard and day-to-day chores—with McCormick equipment! Lift, load, scrape, dig, haul, saw, spray—speed through dozens of odd jobs in record time and at rock-bottom cost! Gain precious hours for better livestock care, field work or fun with the family. Choose from more than 60 chore and special duty implements!



Lift and carry big loads with a McCormick Fast-Hitch hydraulic-controlled platform carrier—for the International® 300 Utility and all Farmall® tractors.



Clear feedlots—grade, level, ditch or terrace with McCormick blades... front, center, and rear-mounted. Also blade attachments for loaders.

Haul safely at higher tractor speeds! McCormick No. 52 tractor trailer has Flexi-Frame... wider tread. Boxes and platforms for any hauling job.

Ask your IH dealer to demonstrate how you can power away your chore-jobs with low-cost equipment for your IH tractor. Use the IH Income Purchase Plan.

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MANURE LOADERS: ☐ U-34A (300 Utility), ☐ 2C-32 (Farmall 200), ☐ No. 34HM-33 (Farmall 300 and 400). *MANURE SPREADERS:* ☐ No. 200-F (75 bushels—fluid) ☐ No. 40 (140 bushels).

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Your veterinarian...

a specialist in Health Engineering

There is plenty at stake these days in owning and managing livestock. Keeping your animals producing at a profit means, first, keeping them healthy. It also means having a friend as near as your telephone to diagnose—to prescribe—to *prevent as well as treat disease.*

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Your part in making Health Engineering profitable

It will pay you to help him in every way you can. One of the most beneficial is to keep accurate health and breeding records for every animal in your herd. This will save precious diagnosis time—help make treatment more effective.

As an expert in Health Engineering, your veterinarian brings to your animals all the latest discoveries of veterinary science—knowledge which can save you many times over the cost of his professional services. Many of the new drugs, for example, are almost miraculous in their effect when administered by a man skilled in their use.

Many of these drugs bear the name E. R. SQUIBB & SONS. It is your assurance of pharmaceuticals thoroughly tested...of proved purity and potency. Nearly 100 years of experience as a manufacturer of precision drugs are behind the Squibb name...a name in which you can unhesitatingly place your trust.

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Enjoy the Greater Earning Power of a *New* JOHN DEERE TRACTOR

The powerful new "720" Tractor with new, full-size, fully integral 4-bottom plow.

Good news travels fast! The new John Deere "520," "620," and "720" Tractors have put peak earning power on the farms of North America—with higher-than-ever standards for work output and ease of handling. Every day, more farmers are seeing these new 3-, 4-, and 5-plow tractors, driving them, and agreeing—with confidence and enthusiasm: "John Deere is the tractor for me." See your John Deere dealer and arrange for a free on-your-farm demonstration. Do it soon!

NEW More Powerful Engines. Completely re-designed combustion chamber provides increased power, smoother performance, and maximum fuel economy.

NEW CUSTOM Powr-Trol. An Advanced hydraulic system that offers as many as three independent hydraulic circuits for precision control of drawn, integral, and 3-point-hitch equipment.

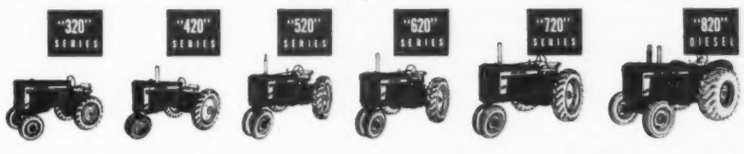
NEW Universal 3-Point Hitch. Provides almost limitless adaptability and features exclusive Load-and-Depth Control to keep you on the move in varying ground conditions.

NEW Independent Power Take-Off. Delivers full engine horsepower, completely independent of the transmission clutch and hydraulic system.

NEW Float-Ride Seat. Absorbs shocks; makes rough fields seem smoother. Easily and accurately adjusted to operator's weight.

Advanced Power Steering. Smoother than ever; offers you new freedom from steering effort and driver fatigue every minute you're at the wheel.

6 Power Sizes... 30 Basic Models



A new John Deere Tractor and Quik-Tatch Cultivator is a masterpiece of precision. New Custom Powr-Trol offers you single lift, delayed lift or selective lift (above) with down pressure on front rigs.

JOHN DEERE

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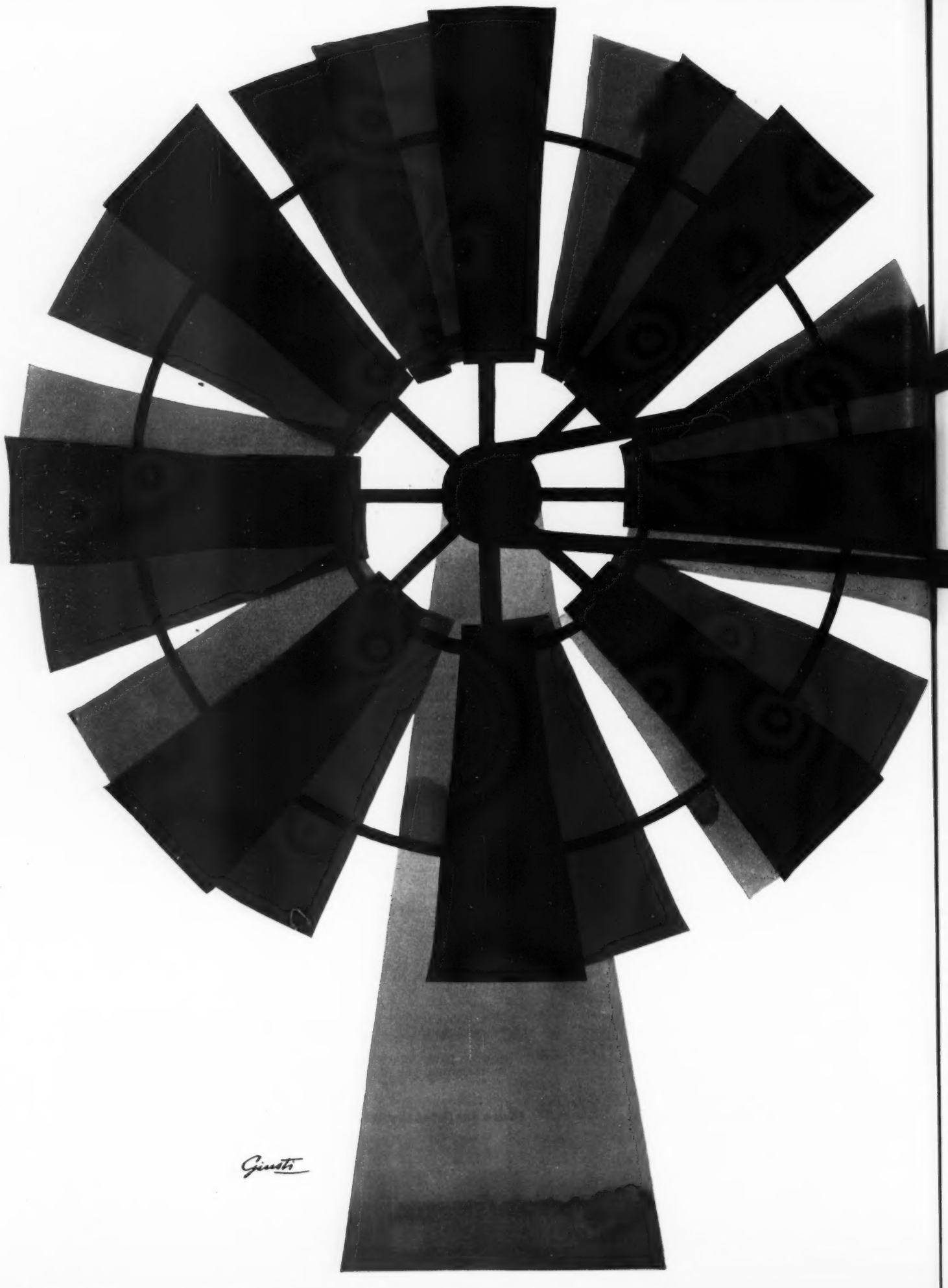
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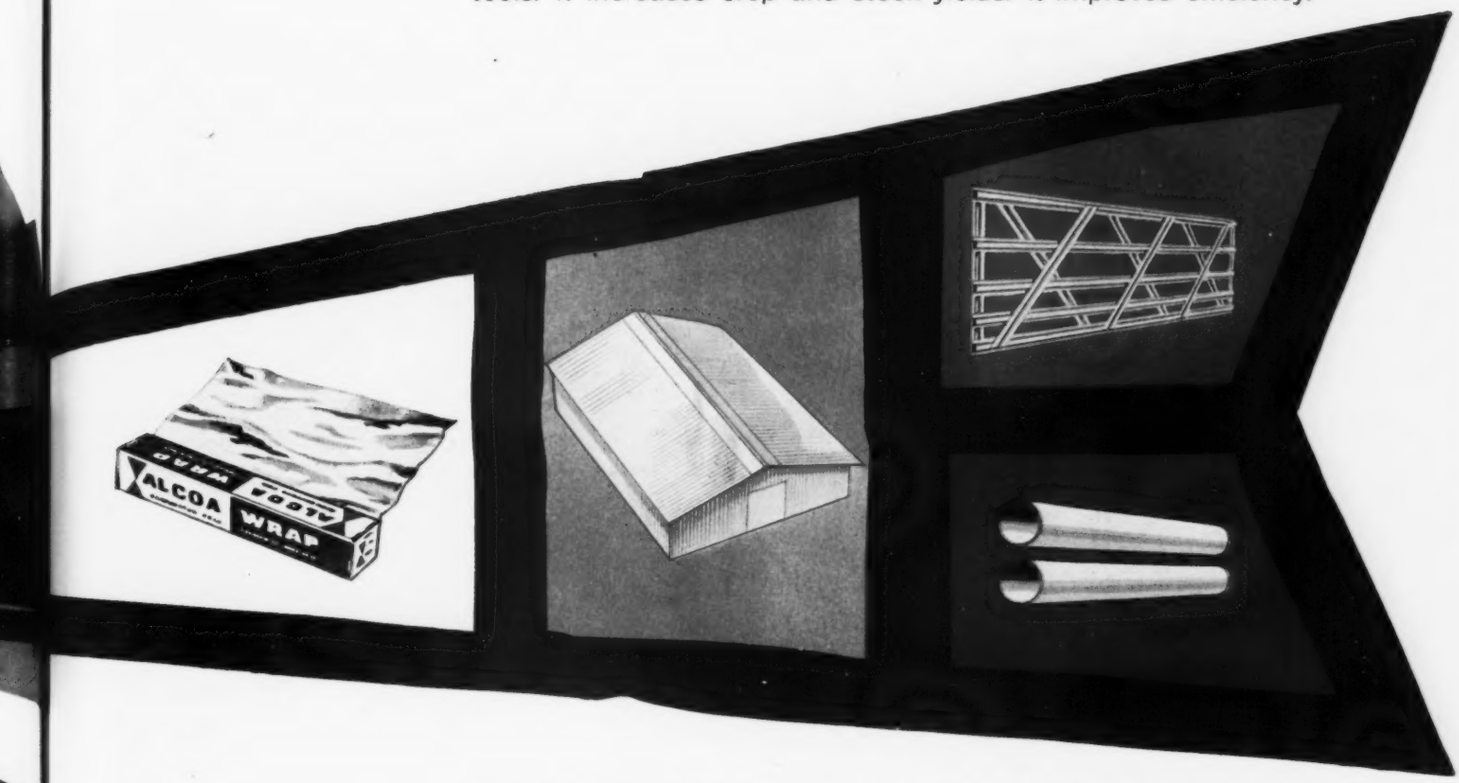
Alcoa Aluminum is part of the Farm Revolution

Aluminum was still a new and rare metal back when the windmill was reaching its heyday. Now you use aluminum all the time. Like the windmill, it has proven one of the best farm production tools. It increases crop and stock yields. It improves efficiency.



Alcoa Aluminum Roofing is long lasting, requires no painting. Its heat reflectivity keeps livestock snug in winter, cool in summer. Comfortable livestock produce more meat, milk and eggs.

Alcoa Aluminum Pipe in your irrigation system insures its long life and bumper crops every year, whether rainfall is normal or not.

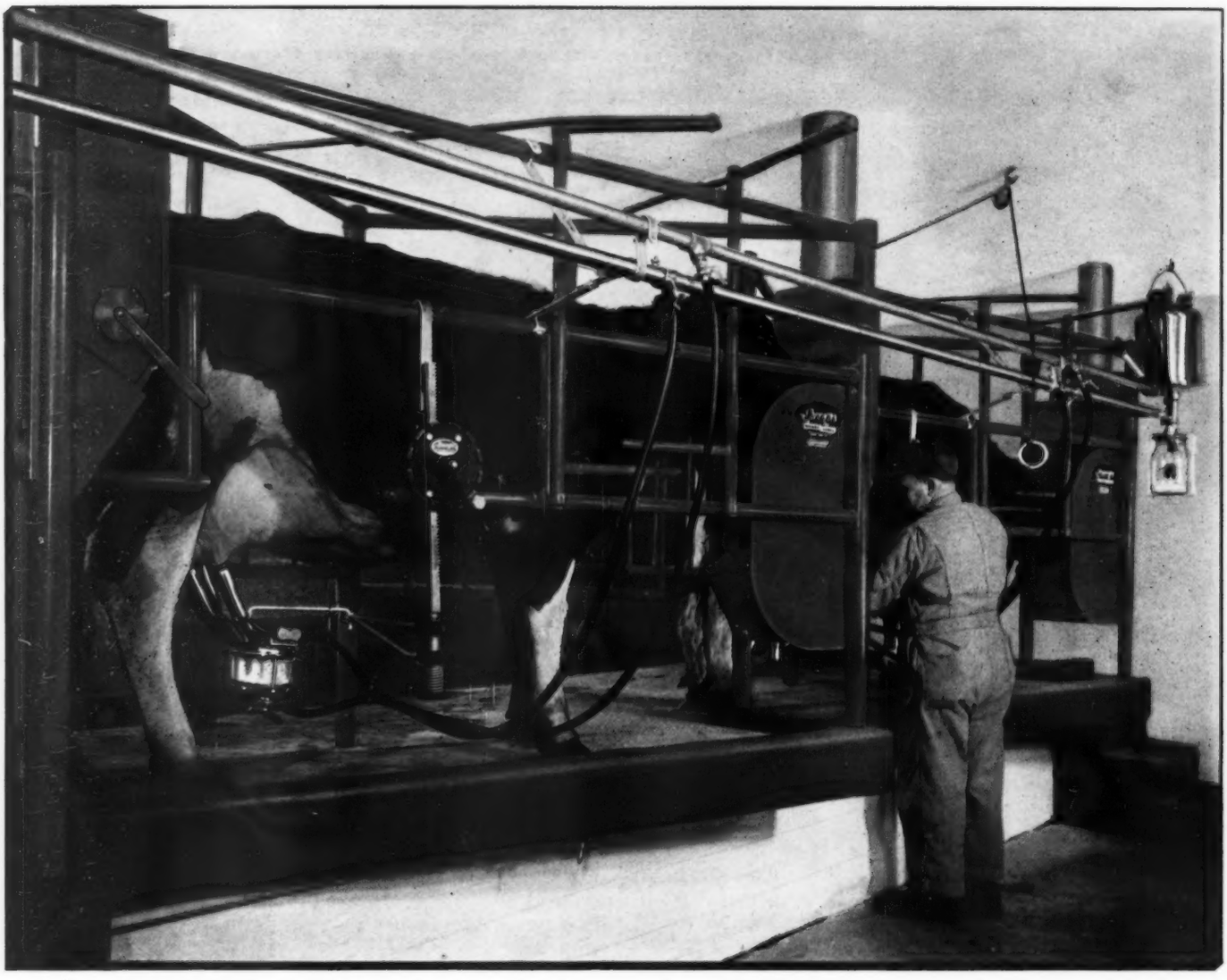
Alcoa Aluminum Farm Gates' long-lasting qualities cut installation and maintenance chores, make livestock handling easier.

Alcoa Wrap helps you prepare, store or freeze farm foods easier, more efficiently. This new aluminum foil is a real work-saver when it comes to cooking, covering, wrapping or capping all kinds of edibles.

Alcoa® offers free profit-increasing information on farm uses of aluminum. ( ) Pipelines to Profit discusses irrigation opportunities. ( ) Alcoa Pole Building Plans Catalog tells how you can save 75% on farm building construction. ( ) Farm Gate folder shows why the Alcoa Gate won't sag, twist, warp or rust. Check information you need and send to Aluminum Company of America, 2071-M Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM
FARM PRODUCTS

Your Guide to the Best in Aluminum Value



Surge Siphon System

Genuine Surge TUG & PULL
plus VISIBILITY

The Surge Parlor makes it possible for the cow to bring her clean milk to a super-clean spot where her teats and udder are in easy, comfortable reach with no stooping or squatting.

The Surge Siphon Breaker Cup in a Surge Parlor Stall probably takes more of the dirt and work and discomfort out of cow-milking than any kind or combination of milking equipment so far designed or built.

Whether you do the milking yourself or whether you hire somebody else to do it, you will get better cow milking with a Surge Siphon System . . . and . . . better cow milking means higher production year after year.

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Forging Ahead Through Leadership Quality, Service and Understanding

The Farm QUARTERLY

Winter, 1957, Volume 11, No. 4

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THE FARM QUARTERLY

22 East Twelfth Street, Cincinnati 10, Ohio

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Spring issue on sale March 7 at all Class A newsstands.

With General Electric Irrigation Motors . . .

"We get an alfalfa cutting every 5 weeks"

"With our new sprinkler irrigation system we get an alfalfa cutting every 5 weeks," says rancher Bob Young, Shandon, Calif. "We sprinkle an average of 15 hours a day, 7 days a week. Most of it is done at night, so top motor performance without breakdowns is a necessity. That's why we specified G-E motors for our entire system."

Janco Pump and Engine Co., Jacuzzi dealer in Bakersfield, Calif., custom-engineered the irrigation system for 215 acres of the Young ranch. After checking crop requirements and land conformity, they built a system consisting of a 100-hp General Electric vertical motor driving a Jacuzzi deep-well turbine pump which fills a reservoir. Water is then pumped to sprinkler lines with 2 Jacuzzi close-coupled centrifugal pumps driven by G-E motors.

"Practically no maintenance is required by G-E irrigation motors," says D. A. Nelson, Janco manager. "They're easy to inspect, easy to lubricate, and the Vistamatic sight gage lets you check oil level at a glance."

Rugged outdoor performance is provided by G-E irrigation motors. Sturdy, cast-iron frame can take rough weather. New insulating materials and protected openings give you year-round reliability, reduce costly breakdowns.

Consult your pump dealer to get all the benefits of an electric irrigation system designed for your particular requirements. And be sure to specify General Electric motors for your system. 870-4

Progress Is Our Most Important Product

GENERAL ELECTRIC

P.O. Box 1064, Schenectady 5, N. Y.
Medium Induction Motor Department
General Electric Co.

Please send me free bulletin GEA-6280 giving more information on the advantages of G-E irrigation motors.

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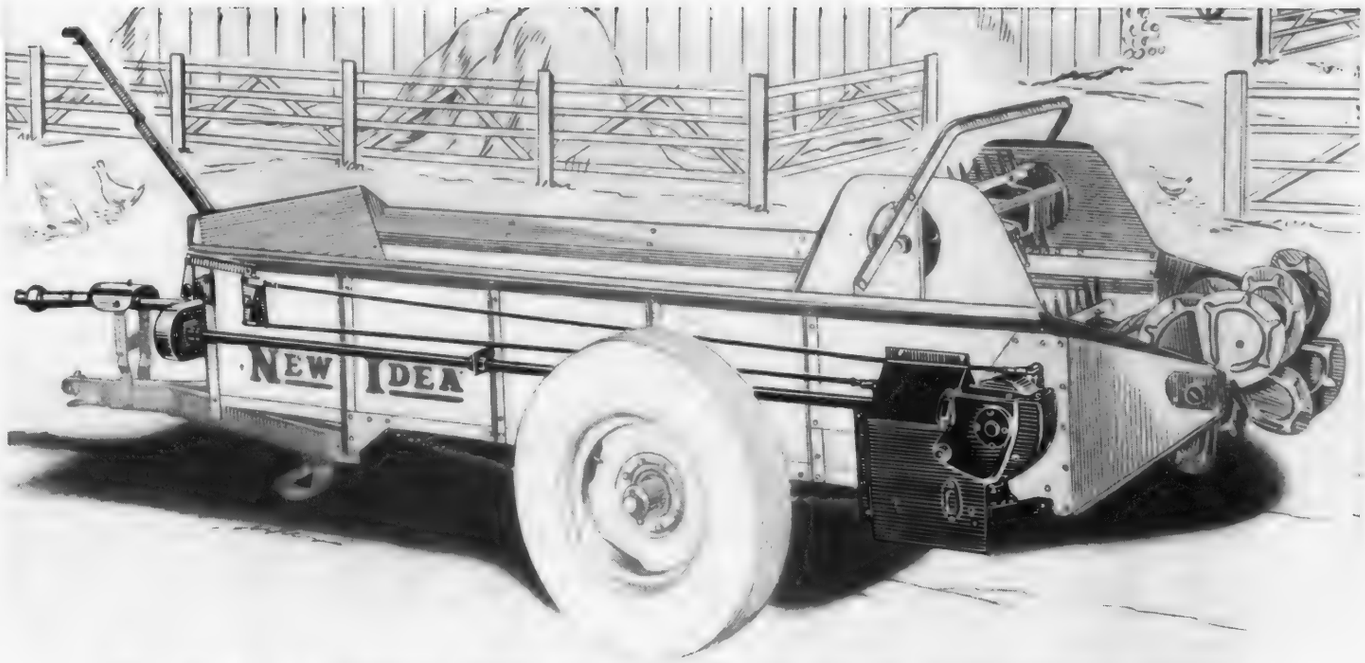
MY PUMP DEALER IS_____



Here's the NEW IDEA spreader farmers have been asking for. This newest of NEW IDEA spreaders, the No. 200, 95-bu. PTO, has all the features that make it spread best, such as triple staggered teeth for finest shredding and paddles designed for best widespread distribution. It's guaranteed a full year by NEW IDEA. You now have a choice in 95-bu. size of ground drive or this new No. 200 with PTO drive and clutch for easy cleanout.

Look at NEW IDEA spreaders before you buy!

The finest you can buy yet costs no more. FIRST in performance, in value, in sales

Most farmers know that NEW IDEA spreaders are the finest made. But be sure you see the new models before you buy. They're better than ever.

Today, NEW IDEA engineering, with severe field testing and latest designing, has made possible the finest quality ever, yet has succeeded in keeping costs down.

FIRST in Performance. Only NEW IDEA spreaders have so many features that give best spreading. Such as triple staggered U-teeth and specially designed replaceable paddles. Your NEW IDEA dealer will gladly prove that with his new comparison charts.

FIRST in Value. Only NEW IDEA has so many features that insure longest life. And there's a full year guarantee. Those long-life features are the reason that a NEW IDEA spreader always brings highest prices at trade-in time.

FIRST in Sales. Unmatched performance and value are the reasons why farmers buy more NEW IDEA spreaders than any other make. For NEW IDEA is the world's largest spreader manufacturer.

See these new spreaders at your NEW IDEA dealer's. Compare the facts about them. And you'll agree that it's just good business to get one of these newest NEW IDEA spreaders.

A SPREADER FOR EVERY FARM NEED.

125-bu. PTO | 95-bu. | 70-bu. | 75-bu. 4-wheel

Best idea yet . . . get a New Idea

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FIRST SHOWING!

New DODGE *PowerGiants*

- **NEW giant-power V-8 engines!**
- **NEW *Forward* Look styling!**
- **NEW higher load capacities!**
- **NEW push-button driving!**

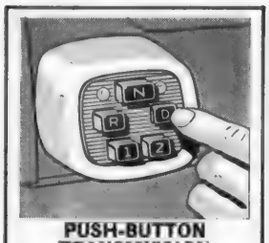
Get set to take the wheel of a great *new* kind of farm truck—with *more* V-8 power and *more* load capacity—with *more* eager-to-go snap than any other make on the road!

From stakes and pick-ups to heavy-duty 4-wheel-drive models, today's new low-priced Dodge *Power Giants* give you more truck per dollar. And they're the *only* trucks that offer you modern push-button automatic driving* and a full-opening hood that can be raised 90° for faster, easier engine servicing.

Test-drive a *Power Giant*—V-8 or 6—soon! Get your Dodge dealer's deal *before* you decide on your new farm truck.

**Available on all low-tonnage models.*

DODGE TRUCKS
WITH THE *FORWARD* LOOK



PUSH-BUTTON TRANSMISSION

First in any truck! Simple, trouble-free. Just push a button, shifting is automatic.

NEW COMFORT CABS

Industry's largest, for real comfort. New seat design; back and height are adjustable, plus slide positioning.

CAT* Diesel Tractors

conserve soil and water and protect your farming future

Your future is closely linked with the soil and water on your farm. A well-managed soil and water program can contribute as much to your farming future as your crop or livestock operation.

You have probably found good soil and water management impossible with limited-duty farm tractors. But with a Cat Diesel Tractor there is practically no limit to ways you can improve and protect your soil. For example, in the upper illustration a 155 DBHP Cat D8 Tractor is shown blending topsoil with subsoil to depths of 20″ or greater to establish a deep rootbed. In the lower illustration a 50 DBHP Cat D4 Tractor moves dirt and clears land to build a farm pond. Other jobs a Cat Diesel Tractor can help you do with new-found ease are building terraces, roads, ditches, forming and subsoiling your land.

For Cat Diesel Tractors are *real* farm tractors! They'll handle your heavy-duty routine farm jobs with greater efficiency than a wheel tractor. Pull more bottoms and wider hitches without slippage. Work in soft ground, mud, or up hills. Accomplish up to 60% more than a wheel tractor of similar rated horsepower working in typical seedbeds. And they give you a big bonus of extra jobs—extra income—extra pleasure!

Have your Caterpillar Dealer show you the many other ways a Cat Diesel Tractor will fit your better farming program. Name the date—he will demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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FREE FARM POWER ANALYSIS

Your Caterpillar Dealer will gladly help you analyze your farm power requirements. See him soon. And write us for a free copy of "Soil and Water Conservation," Caterpillar Tractor Co., Dept FQ126, Peoria, Illinois.

CONSERVE SOIL, WATER AND MANPOWER WITH A CAT DIESEL TRACTOR

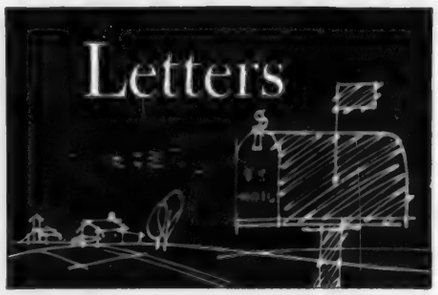
Winter's the time to install
new PC rings in your farm engines!

There's no better time than right now for overhauling those engines which are so vital to your farm profits. And one way to be sure of full-powered performance is to install Perfect Circle 2-in-1 Chrome piston rings.

Perfect Circle's 2-in-1 Chrome set is the finest piston ring equipment made. Both the top rings and the oil rings are plated with thick, wear-resisting solid chrome. Cylinder, piston and ring life is more than doubled! You get *more field time* between overhauls.

Make no mistake! For full-powered performance with positive oil control, insist on PC 2-in-1 Chrome piston rings for your car, truck and tractor. Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Don Mills, Ontario.

PERFECT CIRCLE
2-in-1 Chrome piston rings
The standard of comparison



Inspiration Road

Sirs:

I would like more inspirational articles in farm magazines.

I *know how* to farm a lot better than I *do* farm. My trouble is I don't do what I know I ought to do. Now, don't take this as lightly as it sounds; I observed this same trouble in many others, e.g., my farmer is considered a good worker and he's a lot worse than I am at putting things off.

This is such a delicate point that those who are guilty won't admit it and others are afraid to say anything for fear of hurting feelings—so it is neglected.

I find the real value of articles is not in the information given but their effect as prodders—they sort of prod you into doing what you knew you should do anyway.

The field of information dissemination is fully exploited by farm magazines, all trying to outdo each other on the same street where competition is keen. But at the same time there is an open road, the *inspiration route*, which needs attention and where competition is not keen.

J. P. Bonfield
R.R. 1,
Batavia, Illinois

Moonstruck

Sirs:

Your recent article, "The Moon and Andy," called to mind the following observations:

You couldn't tell the old-timers there wasn't magic in the moon.

I've asked deans, directors, and plain professors about it. With one possible exception, they laughed and said, "Of course not."

But the most eminent scientist of the group had slight reservations. He told me of an experience he had soon after leaving school. His first work was with a group, sort of camping out. He drew a cot by the open window, it was summer. He fared fine there for about a week. Then he had a strange experience. He would feel partly awakened at night and could not move. Seemed to have lost all coordination. Felt foggy, half crazy. Eventually, he could get things to working again. For a night or two it persisted and he became concerned. He told it to an illiterate fellow in the next bunk. It was no mystery to him. He said, "You're moonstruck." Webster defines Lunatic as "Affected with lunacy; moonstruck; now, insane; madness."

He moved his bunk out of the moon's direct rays. The trouble didn't recur. I asked him if, in later life, he had ever chanced to have the thing happen again. Said he had, several times when he inadvertently slept where the moon drifted around and shone on him after he went to sleep. As kids, we were never allowed to sleep with the moon shining on us.

I asked if he knew any explanation of it. Said yes, some folks are thus sensitive to polarized light, such as the moon gives. Since the early days of sailing, men have known it wouldn't do to sleep on deck in the moonlight, for many are sensitive to that light.

I asked a good tobacco grower about the

(*Continued on page* 130)

"We chose the DE LAVAL COMBINE MILKER® because of SERVICE, DEPENDABILITY, QUALITY and UNIFORM MILKING ACTION,"

**Says,
Ronald L. Dann, V.P.,
Dann's Dairy, Inc.,
of Painted Post,
New York**

Dann's Dairy, Inc., in Painted Post, has a herd of 650 head of cattle, including 275 cows which are milked twice a day.

Last February the original barn was destroyed by fire but all cattle were saved. A new barn with a capacity of 260 cows was erected . . . and a De Laval Combine Milker was installed in the nine unit milking parlor. Present rate of milking is one cow every 42½ seconds. Recently Mr. Dann wrote:

"We find that the efficiency is much improved by use of this new system of Pen-Stabling and milking parlor operation. We are able to handle 60 cows per man, whereas the old system would only enable us to handle 50 cows per man. The in-place cleaning of the milk lines eliminated much hand labor, and enables us to produce milk with a much lower bacteria count than we were previously able to do. Our standard plate counts are now running 200-300. Milk is transported directly from the cows through Purex glass tubing to our storage tank, without being exposed to the air in any way.

"We chose the De Laval Combine Milker because of service, quality, dependability and uniform milking action."

***Get all the details on
De Laval Combine Milkers...
Mail the coupon...today!***

**DE LAVAL
SEPARATOR COMPANY**

**THE DE LAVAL SEPARATOR CO., DEPT. 11-M
Poughkeepsie, N. Y.**

Without obligation, send me proof that a De Laval Combine Milker can cut my production costs, increase my milk profits.
I prefer ☐ Separate milking room ☐ Dairy barn installation
I milk about _____ cows
Name _____
Town _____ RFD _____ State _____

BUTLER...the farm building that never loses its usefulness

USED FOR GRAIN STORAGE, this Butler building keeps grain "seed clean" and dry. Precision-formed panels interlock to seal out moisture, vermin and contamination.

MACHINERY STORAGE AND REPAIR in the same building without any alteration! Plenty of room overhead for tall machines.

IT'S A LIVESTOCK SHELTER if you convert from grain to stock farming. Post-free interior is easy to clean, safer for animals.

No matter how your market conditions and farming practices change, the Butler building you erect for one type of farming will still be perfectly suited to your operation. For here is the *one* structure that serves so well for grain storage, for machinery storage and repair, as a livestock shelter and loafing barn, as a storage structure for feed, seed and hay.

Butler buildings are made of the perfect material for farm use—metal. They are firesafe, lightning-proof, vermin-proof, low in maintenance. Butler metal farm buildings last years longer than any other structure in their price class—and even match the life of far more expensive construction. Each panel is securely bolted to the frame for maximum protection against wind and hail. A strong steel framework provides wide-span interiors and straight sidewalls without a forest of posts to limit the usefulness of the buildings. And the special design of the building enables it to withstand grain pressures without troublesome brace rod pits throughout the floor.

A Butler building is an investment that pays off in efficiency, protection and appearance today—and continued utility for years to come.

FIND OUT ABOUT NEW and profitable ways farmers today are using Butler metal Farm Buildings. Write for the bulletin "New Uses for Butler Farm Buildings."

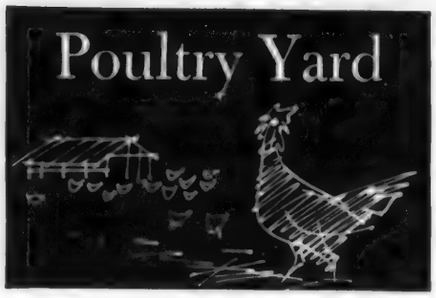
BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

7378 East 13th Street, Kansas City 26, Missouri

Manufacturers of Steel Buildings • Oil Equipment • Farm Equipment • Dry Cleaners Equipment
Outdoor Advertising Equipment • Special Products

Sales offices in Los Angeles, Richmond, Calif. • Houston, Texas • Birmingham, Ala. • Minneapolis, Minn. Chicago, Ill. • Detroit, Mich. • Syracuse, New York City, N. Y. • Washington, D.C. • Burlington, Ont., Can.



Dual Sires Russian research workers are now proposing that two or more matings of the same hen to unrelated roosters can improve the stamina and the vitality of the chicks. Even more radical is their claim that some of the chicks which result from such matings—which must be in close succession—will show distinct markings which must be attributed to both sires.

For their tests on poultry the Russians used three pens of white leghorn hens with ten hens in each pen. Two cockerels of different breeds, unrelated to the hens or each other, were put in two of the pens, one in each, and in the third pen on alternate days. This resulted in the hens in the third pen receiving unrelated sperm from the two cockerels.

Chicks hatched from eggs laid by the hens in the third pen showed considerably more vigor and livability than the crossbred chicks from the other pens. If this result can be achieved commercially, it makes the experiment of real practical value. Their other findings, however, were probably of even greater interest to scientists. Some of the chicks showed coloring characteristics of one sire and some of the other, as was expected. But a very few, contrary to every known principle of genetics, showed distinct markings of both sires.

The next step in this experiment was to take fertile eggs from a pure Rhode Island Red mating, delicately open the shell, and replace some of the albumen with egg white taken from pure white leghorn eggs. When incubated, these eggs produced chicks with some clearly marked white feathers. When these chicks matured, they laid eggs some of which had white shells. The Russians claim that these changes continued in the second generation.

The Russians believed that in the multiple matings only one sperm penetrated the nucleus of the egg. The presence of other sperm, they felt, changed the environment and influenced the development of the embryo. This same environmental change took place when they transplanted some of the albumen. The English publication, *Poultry Farmer*, which reported these experiments, does not guarantee their validity. Their suggestion: If you don't believe them, try them yourself.

Feathers For Feed Feather meal is now revealed to contain an unknown growth factor. Chicks fed rations containing four per cent feather meal are found to make faster gains than those on equally good rations without it.

"I'm MONEY AHEAD ON THE WAYNE 5-STEP HOG PROGRAM"

WAYNE HOG FEEDS

ALLIED MILLS, INC.

FOR More, Stronger Pigs at Farrowing	FOR Pre-Starting Baby Pigs	FOR Heavier Pigs at Weaning	FOR Growing Shoats at Lower Cost	FOR Faster, Earlier Marketing
WAYNE BROOD SOW SUPPLEMENT	WAYNE TAIL CURLER ROCKETS	WAYNE TAIL CURLER	WAYNE PIG BALANCER	WAYNE HOG BALANCER

Helps CUT COSTS – MARKET EARLIER

FREE GUIDE: *For the latest information on hog feeding, write to Allied Mills, Inc., Service Department, Fort Wayne 1, Indiana*

6-1040

What next
from Pfizer and the feed industry?

THEY'RE BEEFING UP
YOUR BEEF FEEDING PROFITS

Sioux City, Iowa—How feeders everywhere can make even greater reductions in their cost of producing beef in 1957 is now being proved out in a 57 county surrounding area.

Called "Beef Project 57", this is a three-way cooperative program between Pfizer, feed manufacturing companies and feeders to demonstrate the best practical application of new scientific developments in beef feeding from many sources.

These new developments have been coming so thick and fast that few feeders have been able to keep up with all of them.

On one thing everybody agrees: A good supplement can stretch grain and help feeders make greater use of low-quality roughages in producing choice quality beef.

The big question has been, what—besides protein—should a good supplement supply, and in what combination and amounts to make the most dependable and economical gains?

In the last couple of years, for example, many feeders have been getting excellent results by using stilbestrol. More recently others have reported even better results with Terramycin. *But when the two were combined in the same supplement the extra gains and savings in feed were greater than with either supplement alone.*

New knowledge of the way dozens of different feed ingredients *work together* has made the older single-purpose supplements as old fashioned as the longhorn. It has shown the importance of a supplement combining the right amounts of several growth and health-boosting ingredients.

Beef Project 57 is now proving out the best combinations for the feeds of the future—along with the facts and figures on how you can fit them into your own feeding-for-profit program *this year!*

Science Comes to the Farm in a Feed Bag

Pfizer

Pfizer Agricultural Research and Development Department

Miracle designed to ease your working days

fabulous MH50 with hydramic power

FIVE FABULOUS MINUTES at the wheel and you know the magic of Hydramic Power . . . the complete coordination of power development, transfer and application . . . the one system that puts power where it is needed — to push, pull, lift, lower, adjust, operate. In a word . . . Miracle-Design.

It's a new world of tractor performance that starts with the staying ability of new TorqueMaster 4 Engines, the greater selectivity of 6 forward speeds, the instant control of Duo-Range clutching.

It continues with the matchless power application of 2 PTO drives . . . the superlative performance of traction on demand built into the Draft Monitor 3-point hitch. And over it all — the fingertip accuracy of Hydramic Master Control.

Ask for a demonstration...See your Massey-Harris dealer today. Test drive the fabulous MH50 and get full information on the Massey-Harris Time Purchase Plan with its unique insurance feature to protect you against losses of many kinds. For folder, write: Massey-Harris, Dept. M-222, Racine, Wis.

Always keep your eye on **Massey-Harris**

For better farming join your soil conservation district.

B.F.Goodrich

"Power-Grip tractor tires give better traction,"

Midwest farmer reports

FREE! **On-the-farm tire inspection. Call your nearby B. F. Goodrich retailer**

Stop tire trouble before it starts with a FREE B. F. Goodrich On-the-Farm Tire Inspection by your Tire Service Man. He'll inspect *all* your tires, give you unbiased advice that will cut your tire costs and save you work time. Here's what he'll do:

1. Check all your tires and recommend proper air pressures
2. Point out tires that should be repaired or replaced.
3. Recommend proper liquid weighting.
4. Check steel-wheeled equipment to see if savings can be made by switching to rubber.
5. Advise you on possible savings to be made by retreading worn but serviceable tires.

EARL MCDOWELL farms 160 acres near Luverne, Minn. Here he uses his tractor to pull a forage harvester that chops up silage and blows it into a truck. The tractor rolls on B. F. Goodrich Power-Grip tires because, says McDowell, "they give me better traction and less slippage." Because they give better traction, McDowell says he gets his work done faster.

B. F. Goodrich builds the Power-Grip tire big and wide. No other tire is wider—and size for size, no tire has more cleats. Power-Grip tractor tires give you more traction both in reverse and forward.

And the husky, square-cut cleats resist slippage, dig deeper into the soil to give you greater drawbar-pull.

Highest trade-ins of the year

Now is the time to get a set of Power-Grip tires. Your nearby B. F. Goodrich retailer is offering the highest trade-ins of the year for your worn tires. You'll save money by buying *now*. See your nearby B. F. Goodrich retailer today and ask about his special crop payment plan. *B. F. Goodrich Tire Company, A Division of The B. F. Goodrich Company, Akron 18, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

DEKALB — Corn — Chix — Sorghum

... Bred to Make You More Money

America's progressive farmers are demanding a constant supply of new and improved products. Efficiency of production is becoming increasingly important to profitable farming. DeKalb Research is keeping pace . . . helping supply this demand with three outstanding products that form an important "triangle of profit" for the American farmer. DeKalb Seed Corn, DeKalb Chix and DeKalb Hybrid Sorghum are bred for more efficient, profitable production . . . bred to make you more money—more return on your investments.

DEKALB AGRICULTURAL ASSOCIATION, INC., DEKALB, ILLINOIS

Commercial Producers & Distributors of DeKalb Seed Corn, DeKalb Chix and DeKalb Hybrid Sorghum

DEKALB SEED CORN

The seed corn that has been planted by More American farmers than any other brand for the past 17 consecutive years.

DEKALB HYBRID SORGHUM

Averaged 26.72% higher yield than standard varieties of comparable maturity in 137 DeKalb 1955 tests in sorghum belt.

DEKALB

Rapidly becoming the favorite layer of American poultrymen . . . the NEW type Chix bred and thoroughly tested for excellent livability

CHIX

and profitable conversion of feed into large, strong-shelled eggs with the exterior and interior quality that egg customers demand.

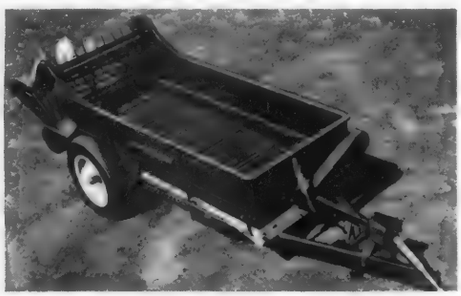
A Great Name in Agriculture

DEKALB

Low, wide and handsome . . . Model 200 is built for easy loading.

Just what the dairyman ordered!

Special construction does away with arch over back of spreader. Keeps the load from "plugging" between arch and beaters. Low height speeds up loading.



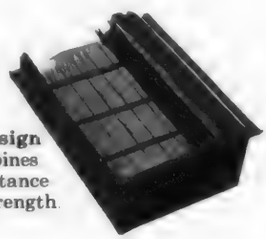
Power-take-off Model 220 spreads easy and fast on frozen, rough and steep fields. Pull-rope at tractor seat lets you select from 4 apron speeds with a flick of the wrist.

With full 100-bushel capacity, this big, low-slung spreader will save you loading time and trips to the field.

No matter whether it is loose, straw-filled manure or tough pen-packed chunks, this spreader lays down an even, finely-chopped layer of just the amount you want on each field. New Holland's high-speed beaters, 4-speed apron and widespread paddles make sure of that.

You can depend on this spreader to stand up for years under the beating of daily use. It is available as a ground-driven or a power-takeoff machine, and with rims for a selection of tire sizes. There's one that's exactly right for your farm.

Smooth-running roller chains are standard on New Holland spreader drives at no extra cost.



Exclusive side-wall design on 100-bu. spreaders combines wood for corrosion resistance and steel for strength.

NEW HOLLAND

"First in Grassland Farming"

Big, trip-saving 130-bushel Spreader is a triple-duty machine.

Just what the cattleman ordered!

This is the big one! Model 330 is for you cattlemen who want to move big tonnages from feedlot to farthest fields. Compared with the small spreaders in common use, this 130-bushel New Holland can cut trips in half.

Just by a tug on the rope control you can start the apron, select one of 4 apron speeds or stop beaters for clean-out.

And this machine doesn't stand idle from one spreading season to the next. When there's silage to put up it converts to a self-unloading wagon. Or, with a cross-conveyor, it becomes a self-unloading bunk feeder.

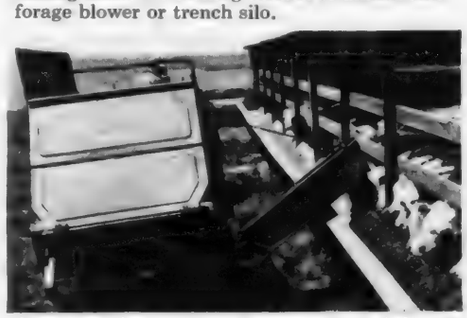
New Holland Machine Company, a subsidiary of Sperry Rand Corporation, New Holland, Pennsylvania.

Model 335 130-bushel capacity on 4-wheel wagon or truck chassis. Especially useful on steep hillside farms.

NEW HOLLAND

"First in Grassland Farming"

You can convert Model 330 to a self-unloading wagon by adding extension sides and mixing hood. No forking needed to unload into forage blower or trench silo.



You can also convert it to an automatic bunk feeder by adding cross conveyor attachment. One man can handle the feeding of several hundred cattle in less than an hour.

Wheels by French & Hecht Division of Kelsey-Hayes

for the workhorses of modern agriculture

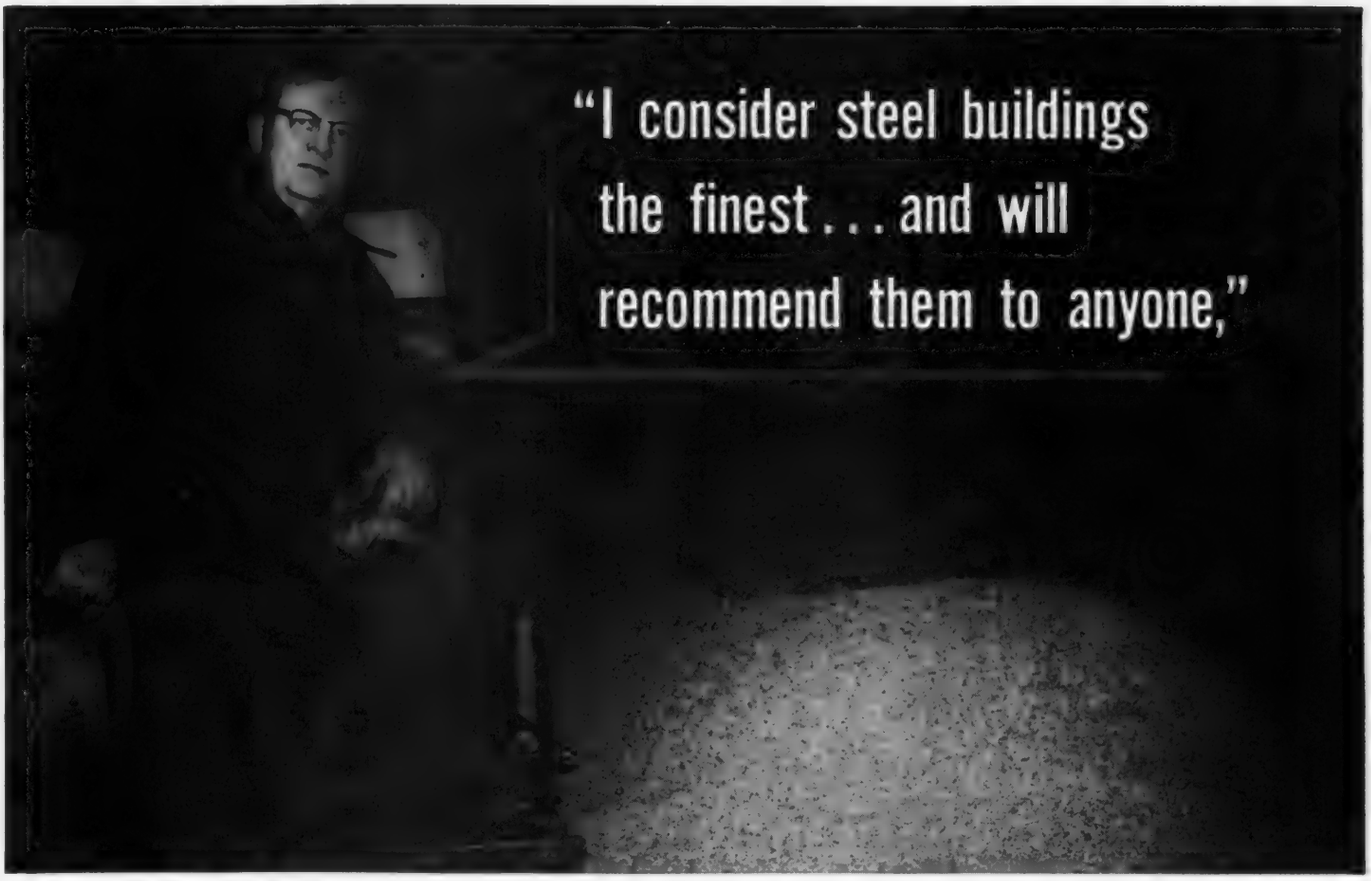
From the monsters of the fields to the highway vehicles that whisk the final product off to market —wheels are vital to the speed and efficiency of modern mechanized farming.

Making wheels for agriculture is a Kelsey-Hayes specialty that started 67 years ago at the French & Hecht Farm Implement and Wheel Division in Davenport, Iowa.

KELSEY HAYES

Kelsey-Hayes Wheel Co., Detroit 32, Mich. • Major Supplier to the Automotive, Aviation and Agricultural Industries

14 PLANTS ***Automotive:*** *Detroit and Jackson, Michigan; McKeesport, Pa.; Los Angeles, Calif.; Windsor, Ontario, Canada* • ***Aviation:*** *Jackson, Michigan; Springfield, Ohio (SPECO Aviation, Electronics and Machine Tool Division); Utica, New York—4 plants—(Utica Drop Forge and Tool Corporation, a subsidiary)* • ***Agricultural:*** *Davenport, Iowa (French & Hecht Farm Implement and Wheel Division)*



says Howard Henry, Westhope, North Dakota

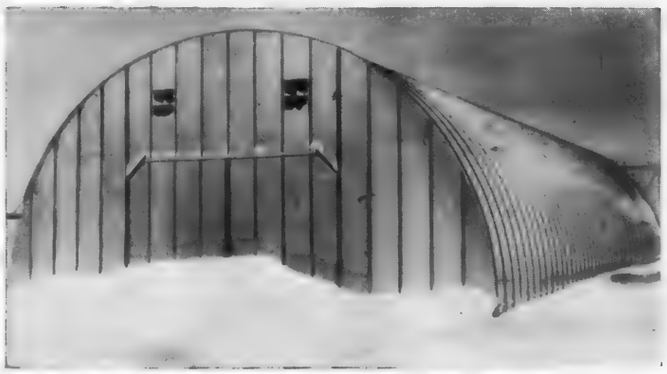
Mr. Henry has a 36′ x 100′ galvanized steel building on his farm, in which he stores 16,000 bushels of wheat and two self-propelled combines. He likes his steel building so well that he plans to erect a 30-foot addition to it in the near future.

Farm buildings using USS Galvanized Steel Sheets have two basic advantages over other types of farm buildings. First, steel is much stronger and more rigid than any other construction material. The Galvanized Steel Sheets won't buckle or rip loose around fastening heads in strong winds, nor will they sag under heavy snow loads. Secondly, Galvanized Steel Sheets are much more fire resistant and have a much higher melting point than other farm building materials. Fire underwriters consider steel construction to be the safest of all. Moreover, steel buildings are easily grounded against lightning.

Buildings manufactured from USS Structural Steel and roofed and sided with USS Galvanized Steel Sheets offer the additional advantages of quick, easy erection, low maintenance cost, and top protection against wind, rain, and rodents. And, the roomy, clear-span steel buildings are versatile—ideal for every use from grain storage to poultry housing.

It will pay you to investigate Factory-Built Steel Farm Buildings, manufactured with long-lasting USS Galvanized Steel Sheets for roofs and walls, and a USS Structural Steel framework.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.



For your assurance of a high quality Factory-Built Farm building ask for USS Galvanized Steel Sheets for roof and sides. These sheets have a zinc coating produced to ASTM Specification A-361.

SEND THIS COUPON FOR FURTHER INFORMATION

Agricultural Extension
United States Steel Corporation
Room 5481, 525 William Penn Place
Pittsburgh 30, Pa.

I am interested in steel buildings for the following:

☐ machinery storage ☐ grain storage ☐ cattle shelters
☐ hay storage ☐ dairy barns ☐ poultry houses
☐ other .....

Approximate size or capacity .....

☐ **Please have a Steel Building representative call on me with further information.**

Send information to:

Name .....
Address ..... **Town** .....
County ..... **State** .....

United States Steel Corporation produces high-quality USS Galvanized Sheets and Structural Steel which our customers manufacture into durable farm buildings. Your requests for information will be forwarded to the manufacturers of these buildings, and you will hear directly from them.

USS

UNITED STATES STEEL

Great New Line of CASE. Spreaders

Only CASE. Dares to Make This Demonstration Offer!

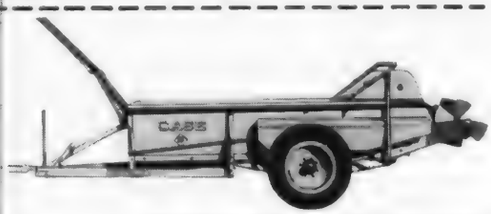
Now you can have a manure spreader demonstration right on your own farm. All you do is to call up your Case dealer.

Nobody ever dared to make such an offer before! And Case can do it now only because of the extra strength and quality of the new Case spreaders.

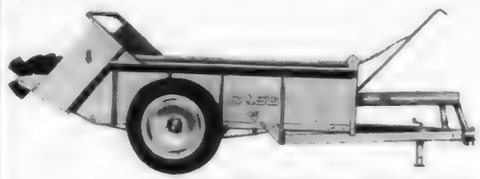
Compare these four great Case spreaders, feature by feature, with any other make. Look at the extra strength built into the steel-ribbed, double-treated wood box, and rigid, channel steel V-hitch frame. Notice the enclosed or shielded roller chain drives and anti-friction bearings—hidden features that add extra years of trouble-free service. See how easily a Case Spreader pulls, how fine it shreds, how evenly it spreads. You won't have to peg-tooth new seedings!

Pick up the phone now. Ask your Case dealer to bring out a Case spreader and power loader to your farm. Ask about the flexible Case Crop-Way Purchase Plan, too.

New 75-Bushel. Both ground-drive models have an adjustable slanting arch. Also heavy steel axles with exclusive center bearing to limit flexing.



Big 95-Bushel. Exclusive self-raising hitch on 75 and 95-bushel. All four spreaders have roller chain drives, plus independent apron control.



New 105-Bu. PTO. Spreader drive mechanism is fully enclosed to keep out dirt and trash. Slanting arch goes under barn cleaners; can't catch on low branches.

Big 125-Bu. PTO. Big capacity saves many trips. Handy screw stand makes hitching easy. Universal drive adjusts easily to tractor PTO height.

Send for 24-page Spreader Catalog

Get the complete story. Ask your dealer, or write to J. I. Case Co., Dept. M-906, Racine, Wis.

Name_____

Address_____

NOW . . . for the first time at new low prices
America's first choice in quality truck tires
THE FIRESTONE TRANSPORT

TRANSPORT
MEANS QUALITY TRUCK TIRES
ONLY
$19.95
PLUS TAX
BUYS THIS HUSKY FIRESTONE TRUCK TIRE
—a 6.00-16 with your retreadable trade-in. Larger sizes similarly low priced at Firestone Dealers and Stores. Terms—low as $1.00 weekly.

That's right! No matter how few or how many trucks you operate, you'll realize big savings now with Firestone high-quality Transports.

Save on initial cost! Get a huskier tire made with deep-tread original equipment design. It's nonskid right down to the tread base. Hard biting . . . quiet . . . easy steering—with extrawide center ribs and straight-line shoulders for maximum resistance against cupping and tread wiping.

Get longer tread mileage! Firestone Transports are lowest cost-per-mile truck tires in their class. Their extradeep treads wear down slowly under severest working conditions on paving, gravel or dirt.

More retreads for extra low-cost mileage! The Firestone Transport is made with an improved high-tensile rayon cord, Safety-Tensioned *Gum-Dipped* by the exclusive Firestone process that eliminates stretch and body-growth problems. Makes more retreadings possible for extra low-cost mileage.

All in all—you can't beat this mighty truck tire value from Firestone. For less than you'd expect to pay for an ordinary six-ply passenger tire you get this heavy-duty Firestone Tire that matches or surpasses the quality of most other makes of "first line" tires. Firestone Transports are great for front wheels and drive wheels *—where they'll save you money at every turn!*

Your Firestone Dealer or Store is featuring Transport truck tires now. See them soon!
Enjoy the Voice of Firestone on radio or television every Monday evening over ABC.

Firestone

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12 important ways that CONCRETE can reduce work and increase production

Thousands of farmers have learned that concrete improvements soon pay for themselves yet continue to return dividends.

1. HOG HOUSES built with concrete are easy to clean, provide economical, comfortable shelter.

2. CRIBS AND GRANARIES built with concrete protect grain from vermin, moisture and fire.

3. FEEDING FLOORS of concrete help raise more meat per bushel of feed. It's not trampled in mud.

4. BARNS with concrete walls protect herds and feed supplies from fire. Concrete floors are sanitary and easy to clean.

5. MILK HOUSES of concrete are cool in summer, sanitary, odor free. They protect milk quality.

6. SILOS of concrete assure ample feed, protect it from the elements.

7. BARNYARDS paved with concrete eliminate mud, save manure. Barns, cattle stay cleaner. Result: less work, more profits.

8. POULTRY HOUSES with concrete walls and floors defy rats, fire, simplify parasite control.

9. MACHINE SHEDS of ***low-annual-cost*** concrete protect machinery from fire and the elements.

10. SEPTIC TANKS of concrete make modern plumbing possible.

11. WALKS AND DRIVES of concrete keep mud, dust out of buildings.

12. HOMES with concrete masonry walls, concrete subfloors and a firesafe roof provide a lifetime of comfortable, worry-free living —cost less *per year* to own.

FREE BOOKLETS about these and other farm subjects available. Sent only in U.S. and Canada.

PASTE COUPON ON BACK OF POSTCARD AND MAIL TODAY

PORTLAND CEMENT ASSOCIATION
Dept. 12-86, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete ... through scientific research and engineering field work

Please send me free literature, which is distributed only in the U.S. and Canada, on the following (list subjects):

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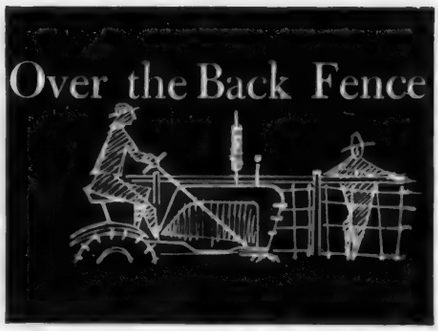


Causa Mortis It beats all what Congress will investigate. Now four Congressmen are spending the present recess investigating methods used in slaughter houses to kill eatable livestock. The National Humane Society is back of this, claiming that the present methods of doing in live meat are inhumane, cruel, and unnecessary. They advocate rendering hogs unconscious with carbon dioxide before the *coup de grace*, usually a throat slitting, is administered. For beef they recommend the captive-bolt pistol, which knocks the animal unconscious. The Society says the packing industry will not introduce humane methods of slaughter unless the law says they must. The four Congressmen will presumably introduce such a law if they are convinced that the present methods are unnecessarily cruel.

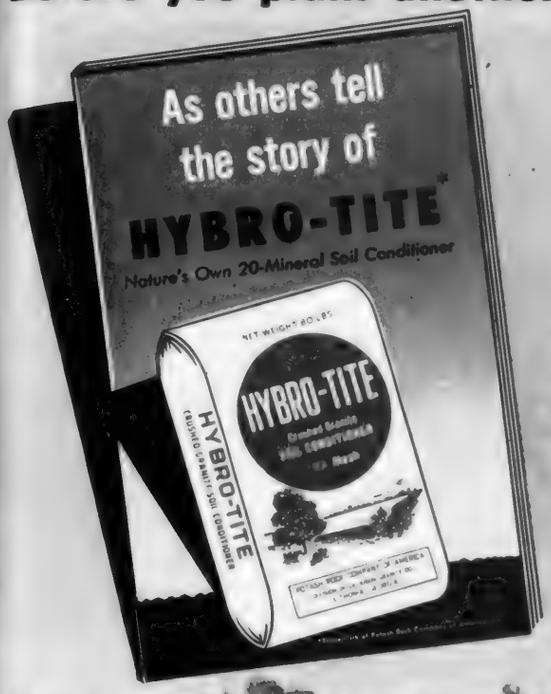
There's Gold In Steel Scrap If you have an old tractor or an old drill or an old binder rusting down back of the barn, you can make a nice wad of birthday money by selling it as scrap to a steel mill. They're paying as high as $69 a ton for the stuff at the mill. And it doesn't take very many old tractors to make a ton. The catch is that steel scrap must be sorted, broken up, and carried to the steel mill; the price quoted is at the mill. But it might be a good way for churches and 4H clubs and such to pick up a little cash.

There ain't no Such Animal In spite of anything mere man can do, livestock have a way of going off on a tangent. Look at what we've turned up here in the way of odds and ends.

This is Cimarron, said to be the world's largest steer. Cimarron is a cross between

(*Continued on page* 134)

Before you plant another crop **GET THIS NEW FREE BOOKLET**



Read 42 case histories — Look at pictures
See how low-cost

HYBRO-TITE*

with 19 trace minerals plus potash**
Helped to sustain soil fertility
Increased yields of grains, grasses, fruits and berries, vegetables and row crops

Henry S. Blitch (left), Statesboro, Ga., applied Hybro-Tite to pasture at one ton per acre, with rock phosphate at 1000 lbs. per acre, in September, 1953. Since that time, no application of any kind has been made, except for light use of nitrate of soda. Several months later, after heavy rainfall, his pastures won third place in the local District Pasture Grazing Contest, and in 1954, first place. In 1955, Mr. Blitch's pastures won first place in the State Pasture Grazing Contest, and have provided "excellent grazing for two beef-type cows per acre."

Many farmers and growers interested in building soil fertility at low cost are testing Hybro-Tite—Nature's Own 20-Mineral Soil Conditioner.

And in many cases, their tests are paying handsome dividends—in bigger yields, better quality, with lower growing costs!

This Hybrid Granite Gneiss frequently supplies one or more of the needed trace minerals that may have been leached out of the soil, or depleted by crop usage. Trace minerals sometimes act as catalysts to make available to plants the nutrients "locked up" in non-productive soils.

In soil building, Hybro-Tite gives you the advantage of hold-over values. One application may benefit your crops for from one to five years. Soil acids and alkalis, plus rainfall, break Hybro-Tite down gradually. Hybro-Tite's low first cost is further reduced on a per year of soil fertility basis.

Before you plant another crop, check your acreage—pick out the areas where you wish increased yields, or need to improve the soil. Apply Hybro-Tite this fall...let it winter and weather. Results next year will tell you how many more acres can be benefited by low-cost, easy-to-use Hybro-Tite.

TOP PRODUCTION AT LOWER COST!

Martin Bitter of Genoa, Ohio (right), gives Hybro-Tite credit for his finest crop of sugar beets as well as for improving his corn yield.

"Even on our poorest ten acres of corn, our yield was well over average . . . Our better corn land with Hybro-Tite and colloidal phosphate made even more than our top production on the ten acres. Some of it ran nearly four tons per acre in spite of a very dry summer," writes Mr. Bitter.

"Our 27 acres of sugar beets made 19.44 tons per acre... largest yield we ever had."

Robert Meyer of Frederick, Ill., shown above in a field of soybeans grown with Hybro-Tite, says this soil conditioner is a "natural" to help you get top production and top quality at the lowest possible cost.

Louis W. Wahl, Harborcreek, Pa., estimated his grape yield, after applying Hybro-Tite, as about 60 per cent larger than the previous year's yield, at a 44 per cent reduction in his growing cost.

Jesse Thompson (above) of Paris, Ill., is enthusiastic about Hybro-Tite for strawberries. "Even though we have been raising strawberries for 15 years, this has been our most successful season," says Mr. Thompson.

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If you are interested in how to build and maintain soil fertility, be sure to send 50 cents for a copy of *Bread from Stones*, written by Julius Hensel, eminent German scientist, 60 years ago.

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Within its 142 pages is a wealth of valuable, common-sense information that you'll want to read before planting time. Your copy will be mailed you for 50 cents, which is less than our cost for printing. And remember, the companion booklet, "As Others Tell the Story of Hybro-Tite," is free. See what other farmers and growers say about this natural soil conditioner.

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Attention of Charles L. Davidson, President
Lithonia, Georgia

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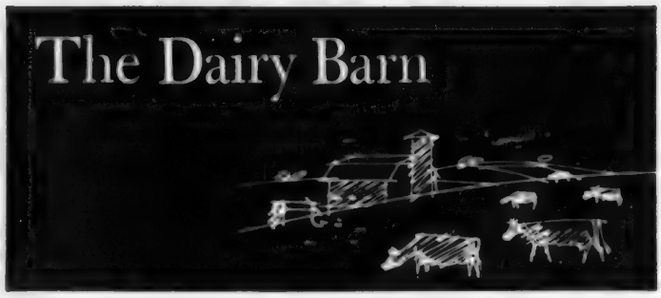


Retirement Fund

Dairy farmers in the Midwest are demonstrating the fallacy of the old saw that farmers won't organize. The dairymen are organizing a pension plan for their group. This is no mere speculation. The framework of the organization has been set up and is ready to go into action once the details of the program are ironed out. Officially named the Dairy Farmers Retirement Association the new organization has for its temporary president Lyman D. McKee, who is also president of the Madison Milk Producers Cooperative Association, Madison, Wisconsin. Ralph M. Cooper, assistant executive secretary of the Wisconsin Council of Agriculture, is temporarily acting secretary with headquarters in the Tenney Building in Madison.

The idea for the association came about when McKee and some of his fellow farm leaders began to express their dissatisfaction with the meager $65 to $70 a month which is the most the average dairyman can expect to receive as social security benefits if he retires at 65. A couple who attempts to retire on this kind of budget in the latter half of the Twentieth Century will have to resort to a Bridey Murphy act in reverse or adopt a policy of deficit financing. Unfortunately, the first alternative is much too difficult for all but the most imaginative individuals and the latter is a policy reserved exclusively to Ministers of Finance.

A couple with other assets might be able to get along by augmenting their social security payments with expenditures from their own nestegg or from investment income. But when McKee and his colleagues consulted with Dr. Marvin Schaars, chairman of the Department of Agricultural Economics at the University of Wisconsin, they were shocked to find how few farmers 55 and over were well enough off to piece out a comfortable retirement this way. Schaars made a survey of the financial resources of groups of farmers in various parts of his state and came up with the following indications:

Assuming that it would take $28,000 to buy an annuity of $125 per month for a farmer age 65 and his wife age 62 payable as long as either lives, only 11 per cent of eastern Wisconsin farmers and only 4 per cent of central Wisconsin farmers approaching retirement age have this much capital.

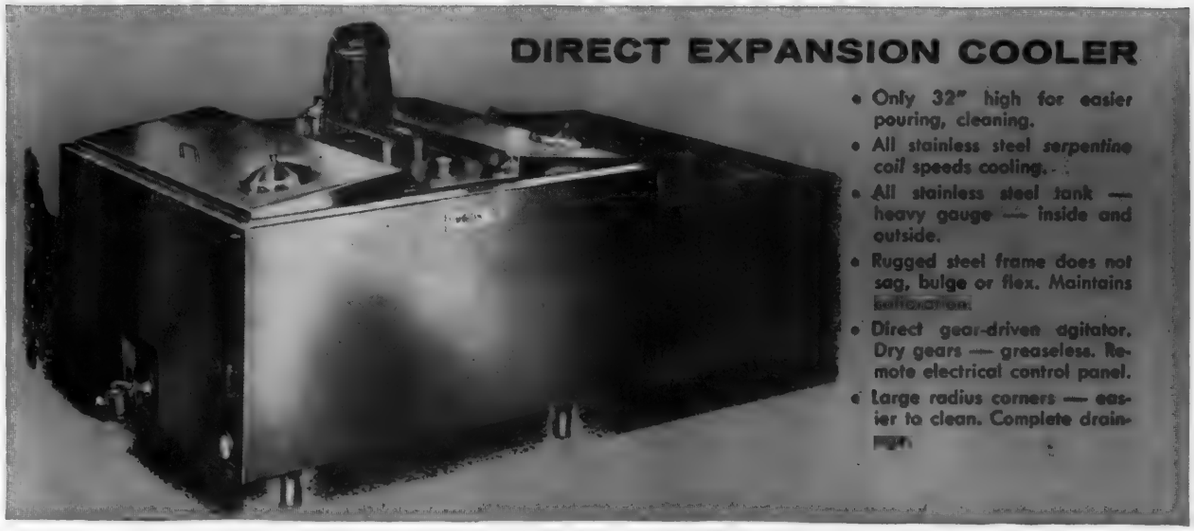
Many farmers—as high as 51 per cent in some areas—carry no life insurance at all. Twenty-five per cent carry less than $2000 of life insurance; 14 per cent carry between $2000 and $5000; and a mere 10 per cent carry more than $5000. Among older farmers this situation is even more acute. In some sections close to 75 per cent of the farmers over 55 years of age are without life insurance at all.

The assets of a large section of farmers are less than $10,000 and these include in large part many of the items such as their home, car and household goods, which they would continue to need after retirement.

All of which makes it very obvious that the American farmer is in a poor position to cash in on his social security benefits without additional help.

In view of these findings the Dairy Farmers Retirement Association has drawn up four tentative plans for providing dairy farmers with supplementary retirement income. If the initial effort is successful other farmers, too, will be included. The plans call for contributions to a central fund by both the farmers and the milk distributors. They are based on an individual 42

(*Continued on page* 125)



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- Only 32" high for easier pouring, cleaning.
- All stainless steel serpentine coil speeds cooling.
- All stainless steel tank — heavy gauge — inside and outside.
- Rugged steel frame does not sag, bulge or flex. Maintains [illegible].
- Direct gear-driven agitator. Dry gears — greaseless. Remote electrical control panel.
- Large radius corners — easier to clean. Complete drain[illegible].

New Jamesway **SANI-KOOL** bulk tanks offer more of the features dairymen want

Here's today's newest, most complete line of milk coolers . . . 11 direct expansion and ice bank models that make every dairyman a customer

Just check the long list of new features — features found only in the new Jamesway Sani-Kool bulk tanks — and you'll see why these coolers are a sure bet to boost sales.

New, low, 32" direct expansion tanks make lifting, pouring and cleaning easier. The powerful condensing unit cools milk fast . . . keeps it cool.

The new Sani-Kool Ice Bank Cooler with all fiberglas plastic cabinet makes "sweet water" cooling easier, more efficient. Tops all coolers in handiness.

What's more, the Jamesway line is the most complete line of bulk tanks — 11 models range in size from 150-gallon to 500-gallon capacity. There's a model to fit the exact needs of any dairyman.

Each tank is backed by a liberal long term warranty, plus Jamesway's record of dependable performance for more than 50 years. Dealers from coast to coast provide reliable local Jamesway service. See your Jamesway dealer now, or write to JAMES MFG. CO., Dept. FQ-126, care of your nearest division office.

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ICE BANK COOLER

- More efficient cooling. Water passes entire length of ice bank.
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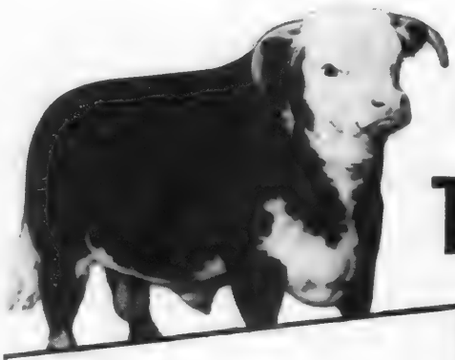
- Modern, tapered design — more knee room.
- All stainless steel frame supports inner tank.
- Electric liquid level indicator for most accurate milk measurements.
- Moist wall inner tank retards formation of milk stone.



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Year After Year These Qualities Make Herefords the Profit Leader

- ★ Prepotent, aggressive bulls!
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- ★ More weight at weaning time!
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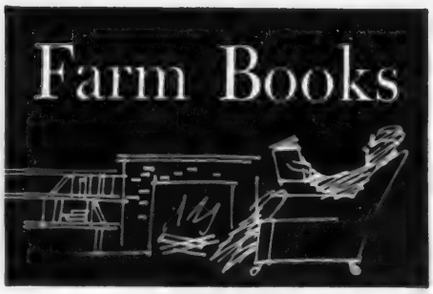
HEREFORDS



***The Grain Trade,** by James S. Schonberg. Exposition Press, New York. $6.00.*

In an economy in which most products go to market with a relatively permanent price tag affixed by the manufacturer, the grain market and its frequent erratic gyrations are a real puzzler to most people other than those actively engaged in the trade. The farmer, in particular, often gets the impression that the products of his labor are used only as so many playing pieces by speculators who bet on their prices and attempt to manipuate those prices to their own advantage.

The purpose of James Schonberg's book is to explain in detail all the complications and ramifications of the grain business. He takes up the factors which operate to determine the supplies of grain and those that create the demand. He explains what futures contracts are and how they work; unravels the complications of hedges and spreads; details the operation of the Board of Trade and the individual brokerage houses; and discusses such factors as transportation, storage, exporting, statistics and news coverage in the grain business and practically every other item of any consequence whatsoever.

Briefly, the book is a handbook of the grain trade written in textbook style by an active member of the Board of Trade. He knows whereof he speaks and gives all the facts.

***Managing the Tenant-Operated Farm,** by James J. Wallace and Raymond R. Beneke. Iowa State College Press, Ames, Iowa. $4.50.*

There are probably as many different tenant-landlord arrangements in the country today as there are leased farms and we doubt if there is one of them that is without its full quota of problems. No book could hope to solve the problems or to avoid all of them, but Wallace and Beneke have certainly provided some guides for minimizing the problems through good management practices.

Their book follows a logical progression from evaluating and buying a farm and selecting a tenant on to the various kinds of agreements and the farming methods they fit. They also have a chapter on operating a farm with hired labor and a final chapter—for those who decide that this is all too much for them—on the selection of a professional management service to represent the owner. Though

(*Continued on page* 132)

All muscle ...no fat

***The Dynamic 4-Plow WD-45 Tractor** with automatic TRACTION BOOSTER system shifts weight instantly to its drive wheels, the way a champion fighter shifts weight on his feet for a knockout punch . . . puts up to 2½ tons total on the rear wheels! Complete with Power-Shift Wheels, SNAP-COUPLER hitch, Two-Clutch Control. Natural-Feel Power Steering optional.*

Remember when Jack Dempsey held the championship of the world . . . pitting 187 pounds of muscle against bulky heavyweights scaling up to 245 pounds?

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The dynamic WD-45 is all muscle—no fat. Fuel-wasting, soil-compacting, tire-wearing, hard-steering "dead" weight has been engineered out . . . *two thousand pounds of it!*

Saving that expensive ton of difference enables you to move faster, do more, save time, make money . . . gives you up to one-third more work-power per dollar . . . plus longer tractor life!

Yes, the 4-plow, 4-row WD-45 tractor is truly a champion worthy of the name. On your farm this trained cost-fighter will make money for you on every job it tackles, and backed by Allis-Chalmers *True Original Parts and Service . . . T-O-P-S . . .* it will always remain in peak condition . . . *TOPS!*

It's easy to own a WD-45. See your Allis-Chalmers dealer today!

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

TRACTION BOOSTER AND SNAP-COUPLER ARE ALLIS-CHALMERS TRADEMARKS. ©

ALLIS-CHALMERS

Engineering in Action

Big corn fields . . . big machinery . . . plus the attentive eyes of the Renk family (another way of saying good management) add up to big corn yields. But that is just halfway through the operation on the Renk farm. Now by both horizontal and vertical diversification the corn is turned into income. It may be processed and sold, as hybrid seed. Or, it may be chopped and fed as high quality roughage. In any case, what's left, the scraps and husks, the odd-shaped grains, go to the hogs and cattle to become another source of farm income. Above, Robert Renk, the farm's machinery man, on the tractor seat, opens up a ripe and heavily laden corn field. Left, Walter Renk, the farm's general manager, watches while cattle fatten.

Family Farm 1957 Style

By Fred Knoop

DOES THE FAMILY FARM FACE EXTINCTION?

The 92-year-old Renk farm is a husky example of a family operation that has grown big and prosperous in today's markets

THE EXPERTS have done considerable speculating along the lines of "What is going to happen to the family farm in the coming years when automation gets into full swing in barns and fields?" They ask, "How can a family put up the money it takes to buy a big, productive farm, then spend that much more for equipment?" Or, "With farm prices down, how can a farmer compete with the factory for hired help, or even keep his own children on the farm to help him?"

The answers to these questions, plus a hatful of other problems that are being viewed with alarm by the experts, have been laid on the line by the members of the William F. Renk family of Sun Prairie, Wisconsin. For this 92-year-old farm is geting huskier every year; and the ideas that seem to sprout as fast as corn in June have turned the 1118 acres into an operation that passed a $600,000 gross in the fiscal year ending in June, 1956.

This family of professional farmers have no other irons in the fire. They have made a study of their land, their costs, their talents and the markets near them. The farming plan they have come up with for 1957 is one based on an income distribution of, roughly, 58 per cent hybrid corn, small grain and grass seed production and sales to other farmers in the upper tier of the Middle States, 38 per cent devoted to a beef and hog operation, and 4.0 per cent in a dairy operation. Renk farming, in a couple of words, is "flexible farming". Almost daily contacts with research men at the University of Wisconsin, with Chicago and Madison buyers, with the feed suppliers, and a constant probing for more economical methods of feeding and production keep the operation extremely flexible and able to change, buy, or sell as the situation demands. Unlike many businesses of such size, this farm's Board of Directors can be assembled in a matter of minutes to make the big decisions. They all live within half a mile of each other.

To see what gives this family farm its vigor, we have to look in on the members of the family. William F. Renk is 82, yet he makes a daily round of the farm in his Chrysler Imperial, and he greets every guest who comes on business, or just to look. It was his father, Nicholas Renk, who started putting the big farm together in 1864. He bought the home place of 80 acres that year. As a boy of nine, Nicholas had come from Bavaria and as he grew up, he decided there was no land to the west, either free or cheap, that could compare with this deep, black Wisconsin soil. In 1872 he built the barns on the home place and by 1880, when he owned 200 acres of land, he built the Renk homestead, the largest in Dane County; the price—$3000—seemed high to most of his neighbors. When Nicholas died in 1888, he had put together a farm of 297 acres. There was a fine herd of Shorthorn cattle and several flocks of Shropshire sheep. His sons, William and Henry, were already farming it along with a sister, Catherine.

In 1898, when William Renk graduated with honors from the short course in Agriculture at the University of Wisconsin, things began to happen. With his brother, Henry, he bought their first imported purebred Shropshire sheep to add to the grade flock. In that year they established

What does a sales manager do when he isn't selling? Wilbur Renk (above) watches his new crop of seed corn as it comes to the sheller. A bad ear gets tossed out, personally. Top, Robert Renk making silage. Below, John, a fourth generation Renk looks for tusk trouble.

These are the Renks, with one of the farm's most profitable crops. From left to right, Walter and Wilbur, William, the father, and Robert, on the tractor. In the background is the first silo built on the farm and one of the first in Wisconsin. It is still in use. On the opposite page is the 1956 Field Accounting sheet. This tells what was spread on each field in the 1118-acre farm and what the crop was.

a Milking Shorthorn herd, and erected the first upright stone silo in the country. It was a good investment; it cost $138 to lay up the limestone in a 16-foot diameter circle 30 feet high. Today it still carries 145 tons for the Angus breeding herd in the farm lot. Small grains, corn and hay were the crops that grew best and biggest, and every fall there were Hauling Bees. The neighbors all joined in the good times. Big baskets of fried chicken, apple pies made from McIntosh and Northern Spies, and a dozen kinds of preserves and relishes, rode along on the sleighs loaded high with sacks of Oderbrucker barley, down to the railroad station at Cottage Grove. Here it was shipped to the brewers in Milwaukee.

In 1901, William Renk married a girl from a nearby farm, Caroline Derr. Four children were born in the busy farming years that followed: Walter, Robert, Wilbur, and a daughter, Marion.

In 1906 the Renks imported 20 Hampshire sheep from England and established the breeding line that was to top at the state fairs and International in Chicago. In 1907 and 1909, William Renk made trips to England to select the top animals from Hampshire flocks there. In 1910, Henry Renk's health was such that he offered to sell out his part of the farm. William Renk bought him out, and the "& Sons" was added to the farm name.

The sheep and grain operations continued to grow. A feed lot for handling Western sheep was built in nearby Columbus, Wisconsin, and as many as 18,000 were fattened in a year. The purebred sheep were sold all over the country and twice a year an auction ring was set up in the machine shed on the Renk farm, with buyers willing enough to outbid each other to make the Renk sheep the top-priced animals for a number of years. William Renk was honored in 1938 as one of the nation's great breeders and his picture was hung in the Saddle and Sirloin Club in Chicago.

But times and markets changed. The Renk sheep operation was closed out at its high point; the Shropshires were dispersed in 1948. In 1952, the Suffolks and Hampshires were dispersed at the highest average prices ever paid in an auction sale for these breeds. The Renks have never felt that the pride of accomplishment should freeze the farm into any rigid program. Besides, farming operations had changed; the market no longer was absorbing lambs and mutton at high prices. People wanted fried chicken in the basket and the hamburger was king.

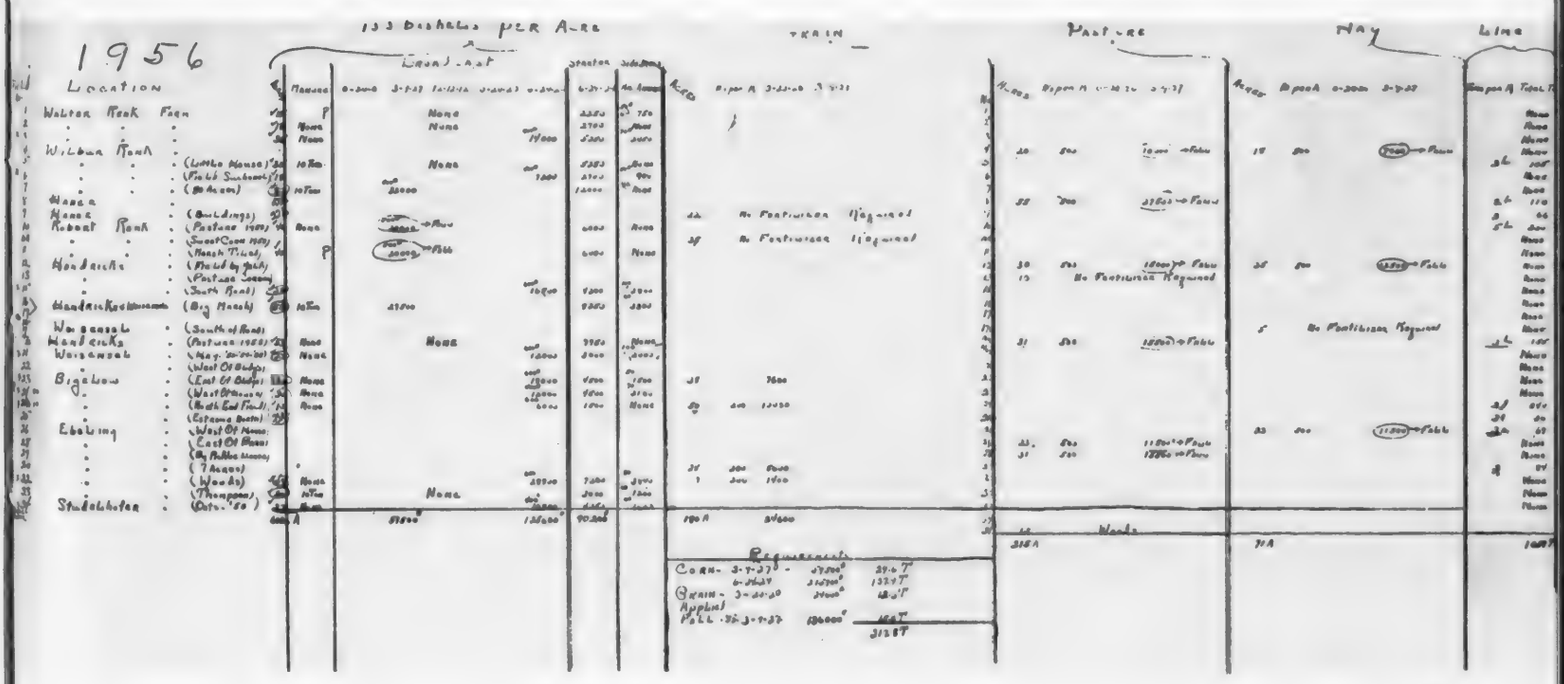
Synthetic fibers were making the wool market one that the government supported, rather than the public.

But the most important reason for the Renks going out of the sheep business was the revolution in farming that swept through the Midwest, starting in 1932. In that year, in Iowa County, down in southwestern Wisconsin, there were 10 acres of hybrid seed corn grown. The next year the Renks were in the hybrid seed corn business. The ears of corn from their first 10-acre field were hung on strings in the barn, then carefully shelled by hand, graded, checked for germination, and packed. This first hybrid seed corn sold for $15 and $16 a bushel. Seed corn was not a new crop for the Renks. They had retailed and wholesaled Wisconsin Golden Glow for years, but hybrid corn was something new. Farmers came from miles around to see it growing. And when it was harvested, the skeptics had to eat their stories. Here by a simple substitution of one bushel of golden seed for another, an indifferent yield of 60 to 70 bushels was upped in a year to 100 to 125 bushels. It took no more work; no more cultivating; just more ears to pick and sell or feed. It was as simple as that! Renk Hybrids grew by leaps and bounds, and with them the amount of roughage left over as waste or roughage feed. That was the prime reason the big herds of feeder cattle were brought onto the farm. They could do a better job with roughage than the sheep could.

Another big change came to the Renk operation soon after the hybrids arrived. Walter and Wilbur had graduated from the University of Wisconsin Agricultural College. Robert had attended for a year. Farming as a business didn't look too good in the 30's, not to three young men with ability and ambition.

Says Walter Renk, "Things were tough in those days. Like so many farm enterprises, everyone was working for Dad. Everything was Dad's. We began wondering which part of this outfit was ours. And if we were all going to have to pitch in and pull the outfit through, we wanted to know what we would do if something happened to Dad. So Wilbur, Robert, and I called a meeting to talk over the whole idea of planning ahead. Dad was a widower (my mother died in 1927); if he had married again, his wife would have shared in the farm split-up if she outlived him. We owe a lot to Dad. He said, 'Let's think this over and meet again.' So we did, and from that second meeting came the idea to set up a farm family corporation. As far as we knew, it was the first family farm in the country to be incorporated. The incorporation is the backbone of this farm. From the time we put it into force, we all knew where we stood. All three of us stayed on the farm. Wilbur took charge of the hybrid seed corn production and sales. Robert, who is the mechanical one, took over our growing machinery line-up. I took on the management, along with Dad. We have elected officers: Dad is Chairman of the Board; I am President and General Manager; Wilbur is Vice President. We work for a salary. We have stock and each owns shares. It meant this, though: Dad had to sell or give away some of his interest before he planned to. Provisions were made for him so that we couldn't cut him off, if we wanted. If something should happen to Dad, or any of us, this farm will never miss a beat.

"When you draw up incorporation papers for a farm, you put everything down in black and white and avoid the possibility of family quarrels at some later date. And be sure to get the best lawyer you can



Feed For: Shipping Cattle Date: Sept, 1956

Ground Ear Corn	lbs.
Shelled Corn.	700 lbs.
Cracked Corn.	lbs.
Whole Oats.	700 lbs.
Krimped Oats.	lbs.
Ground Oats	lbs.
Krimped Barley.	lbs.
Bran.	lbs.
Linseed Pellets	lbs.
Cottonseed Pellets. 29 seconds	500 lbs.
Molasses Pellets.	lbs.
Calf Manna.	lbs.
Calf Starter.	lbs.
Salt	lbs.
Bone Meal	lbs.
Anti-biotics.	lbs.
Alfalfa Meal.	lbs.
Tankage	lbs.
	lbs.
	lbs.
	lbs.
	1900

Feed For: Pigs Date: Sept 1956
Ground Ear Corn (1600) 4480 lbs. — Fine Grind 1.5 lbs. = cwt (1120)

Shelled Corn.	lbs.
Cracked Corn.	lbs.
Whole Oats.	lbs.
Krimped Oats.	lbs.
Ground Oats 400	300 lbs.
Krimped Barley.	lbs.
Bran.	lbs.
Linseed Pellets	lbs.
Cottonseed Pellets.	lbs.
Molasses Pellets.	lbs.
Calf Manna.	lbs.
Calf Starter.	lbs.
Salt 10	10 lbs.
Bone Meal	lbs.
Anti-biotics.	lbs.
Alfalfa Meal. 100	60 lbs.
Tankage 110	60 lbs.
Soybean 140	120 lbs.
John's Formula I 946	840 lbs.
	lbs.
15%	13%

John's Formula I 2 lbs. Vigofac, 2 lbs. Terramycin, 2 lbs. 32% Zinc-Sulphate, 2 lbs. Progen 20%, ¼ lb. Vit. B-12, ¼ lb. Essential Amino Acids

Feed For: Heifers-Apartment Date: Sept, 1956

Ground Ear Corn	lbs.
Shelled Corn. Ground.	310 lbs.
Cracked Corn.	lbs.
Whole Oats.	lbs.
Krimped Oats.	lbs.
Ground Oats	lbs.
Krimped Barley.	lbs.
Bran.	lbs.
Linseed Pellets	155 lbs.
Cottonseed Pellets. (9 seconds)	155 lbs.
Molasses Pellets.	lbs.
Calf Manna.	lbs.
Calf Starter.	lbs.
Salt	7 lbs.
Bone Meal	20 lbs.
Anti-biotics. 2½ Grams Penicillin	6.98 grams
Alfalfa Meal. Pellets (7 seconds)	78 lbs.
Tankage	lbs.
	lbs.
	lbs.
	lbs.
	725

Feed For: Feeders Date: Sept 1956

Ground Ear Corn	2500 lbs.
Shelled Corn.	lbs.
Cracked Corn.	lbs.
Whole Oats.	lbs.
Krimped Oats.	lbs.
Ground Oats	lbs.
Krimped Barley.	lbs.
Bran.	200 lbs.
Linseed Pellets	200 lbs.
Cottonseed Pellets.	lbs.
Molasses Pellets.	lbs.
Calf Manna.	lbs.
Calf Starter.	lbs.
Salt	10 lbs.
Bone Meal	30 lbs.
Anti-biotics.	lbs.
Alfalfa ~~Meal~~ Pellets	200 lbs.
Tankage	lbs.
Molasses Feed	200 lbs.
Stilbestrol in Corn	800 lbs.
	4,140 lbs.

The 800 lbs. of Stilbestrol in corn is mixed 10 lbs. of Stilbestrol with 2,000 lbs corn. 800 of this is what is added to the above. (at 10 #/head, should feed 414 head)

These are some of the farm's feed formulas that are mixed in the big mill. Only a few seconds running of the high-speed conveyor is needed to meter out the right amount of ingredients. About 25 formula sheets like these are kept on the clip-board for the mill man.

Feed For: Dairy Date: Sept, 1956

Ground Ear Corn	3,000 lbs.
Shelled Corn.	lbs.
Cracked Corn.	lbs.
Whole Oats.	lbs.
Krimped Oats.	lbs.
Ground Oats	3,000 lbs.
Krimped Barley.	lbs.
Bran.	400 lbs.
Linseed Pellets	250 lbs.
Cottonseed Pellets.	lbs.
Molasses Pellets.	lbs.
Calf Manna.	lbs.
Calf Starter.	lbs.
Salt	53 lbs.
Bone Meal	50 lbs.
Anti-biotics.	lbs.
Alfalfa Meal.	500 lbs.
Tankage	lbs.
Soybean	250 lbs.
	lbs.
	lbs.
	6703

find, one who knows corporation law.

"So what happens when one of our children want to go to work for the farm? Take my son, John. He graduated from Wisconsin Agricultural School, spent two years in the army, then went back and took his Master's Degree. He is interested in hogs. We sat down and talked over the possibility of having him as our hog manager. He had new ideas based on the work he had done with some of the top men at the University. We handle around 1500 hogs a year that we buy as feeder pigs. John thought we should raise some. So we hired him on a salary. He's done a good job, too, fattened 500 pigs here this year and didn't lose a one. The next question that you may ask is how does John get some stock in the corporation. It's just like any other business. He would have to buy some from me, from one of the other members, or he would have to be given some.

"We gradually expanded; through the '40's and '50's we added acreage, when we found farms right near us that were for sale. Now we have a total of 1,118 tillable acres."

The Beef-Hog Operation

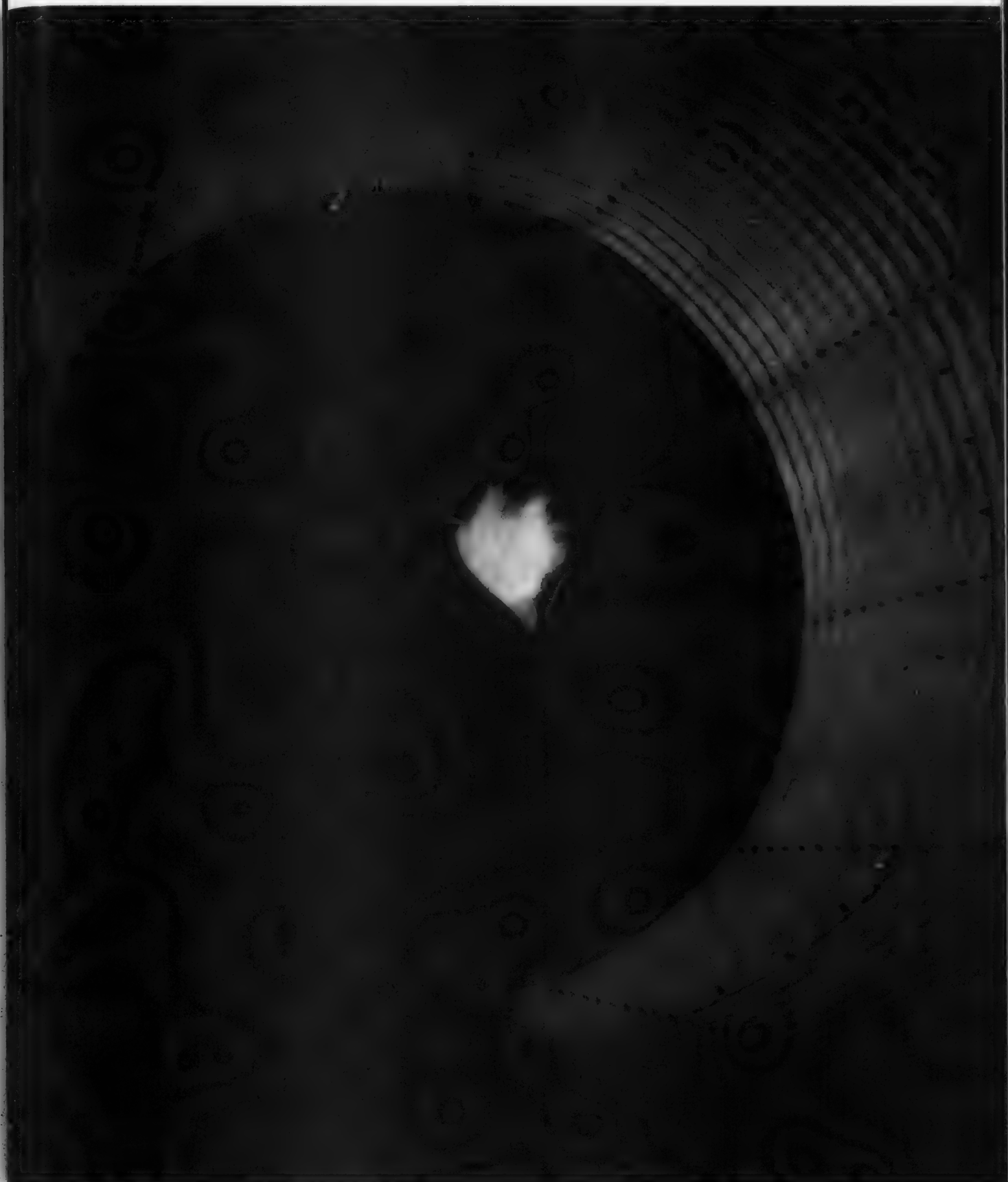
"Farming is a rush business," says Walter Renk. "We are always looking for ideas that will save us time. Our beef cattle operation has proved to be the one in which we can do most of our work with machinery. With two men on tractors pulling self-unloading wagons and one man at the trench silo loading the wagons, we can feed all of our cattle—as many as 1500 during the year—in about an hour.

"Our cattle buying and feeding program is tailored to the conditions as we see them each year. To trace through the cattle we sold in the fall of '56, I'll go back to the fall of '55. I went out to Wyoming, Montana, and Nebraska and bought our good cattle. There were 543 steer calves, averaging 420 pounds. They cost us $20.35 a hundred by the time they were on our farm in Sun Prairie. There were 152 heifer calves averaging 342 pounds that cost $18.66 on the farm. There were 88 yearlings averaging 676 pounds, costing $18.56. These came in from the range by train in November with just one feed, water, and rest stop on the way back. The Nebraska cattle we brought in with semi-trailers in November or December. Then we filled out our lots with the very plain cattle from southwestern Wisconsin and eastern Iowa. We buy them when the farmers down along the river run out of fodder and feed toward the end of December and early in January. Last year they cost us $12.43 a hundred delivered here. They weigh anywhere from 400 to 700 pounds.

"All heifers must be tested for Bangs, or be calfhood vaccinated, but we don't worry about shipping fever shots. With modern drugs, it is easy to stop any cases that do develop. Out of all the cattle we brought in here last year year we lost only six. That was a higher death loss than usual for us. There were only three of these that had shipping fever. We start out all the cattle by sorting them by lots, similar in size and disposition. The first feed they get is pure bran in the bunks. This is cooling, bulky and laxative, just what they need after the trip. If we had prairie-grass hay we would give it to them, but since we don't, we give them rough hay. We put baking soda in their drinking water. After a couple of days we put about ⅓ oats into ⅔ bran, about 2 pounds per animal over a period of a week. After these animals have been around the lots a week or so, we turn them out in the cornstalk fields. This is what they like; they are used to the open spaces, and they do well in the winter months without any shelter. After they have seen hogs through fences, we put some in the stalk fields with them. They would be scared of hogs at first.

"We don't usually have to start feeding silage out of the big 3500-ton trench silo until well into December when the cattle have cleaned up the dropped corn and leaves. Then each one gets 2 lbs. of a grain and concentrate mixture on top of 30 lbs. of silage. In a normal year our beef cattle would go on a heavier grain ration, just at the time they were put in pasture in May. We would build up the grain to 10 pounds per animal and start feeding stilbestrol, 10 milligrams per animal per day. (See formula above.) They would finish on this feed in 4 or 5 months. The steers would weigh around 1200 pounds and heifers 900 to 1000. But this year we had to change our feed set-up; we're flexible on that as well as anything else. With corn at $1.56 ($1.58 a bushel in June) we just delayed going on our heavy corn ration until we had some new corn in August. We still had lots of grass silage so we

(*Continued on page* 104)



The heater for the grain dryer on the Renk farm was made to move a tremendous volume of 100-degree air. A 200,000 BTU oil burner shoots its flame into the big Armco culvert. The flame baffle, upper right, spreads the heat. The air is sucked in so that it must travel the full length of the outside of the culvert before it comes inside and past the flame. A 50-hp motor drives a big squirrel-cage fan, which is directly behind the camera position.

Fight Frost with IRRIGATION

Freezing water protects crops against killing frosts. With irrigation, farmers extend the growing season to hit the profitable early spring and late fall markets

ON THE NIGHT of May 10, 1956, Frank Deaner listened to the nine o'clock weather report from Benton Harbor, Michigan, ten miles away. Then he put on a denim jacket over his two woolen shirts, pulled on his overshoes and started out on his nightly frost patrol. At the door he picked up a bucket of sandwiches and coffee his wife had set out for his midnight snack.

Outside, he looked at the clear, sparkling sky and felt the crisp air flowing from the north. He didn't need the announcer's cultivated voice to warn him that this was a dangerous night for truck farmers. He ran a finger over the cab of his pick-up, checking for frost, and started for the fields. His first thermometer, hanging low among the dark green leaves of his strawberries, registered 36 degrees. Here and there a white blossom glowed in the beam of his flashlight as he walked over the 25-acre field checking the other three thermometers.

At 11:30, an easterly breeze warned him of a weather change and a few minutes later the thermometer confirmed it. At 11:50, he started the pump at the pond. As the big engine roared in the still night, he watched the water pressure gauge until it settled at an even 100 pounds pressure; then he got into his truck and started back to check the system. He grinned as he saw car lights leave his neighbor's driveway and head for the field; if the roar of the irrigation engine hadn't roused him, Deaner would have driven by to warn him of the frost.

At intervals during the cold, tedious night he checked the system to be sure that the pressure was constant, that all of the fittings held together and that the nozzles remained unplugged and rotating. When he started back to the house for breakfast, the early sun glistened on 25 acres of ice. Every leaf, bud, and blossom of every plant was heavily coated and the plants themselves were supported by unnatural stems of ice that sparkled in the morning light. Bob Palmer, the irrigation specialist of the Sodus Fruit Exchange, had been patrolling his customers during the night and was waiting at the house when Deaner arrived.

"Well, Bob, I figure that in five minutes last night I saved the four thousand bucks you charged me for that new equipment," Deaner greeted him.

To a new-comer to frost protection, a field of tender, blossoming plants covered with ice might not seem like much of a saving, but Deaner knew that he had at least won this night's battle. And the ice was the thing that had won for him.

"Cooling," a scientist has said, "is simply the process of losing heat. Coldness is not a thing in itself; it is like darkness—absolute darkness is the absence of any light and absolute cold the absence of any heat. Heat and light *are* things; they are different forms of energy."

In studying this phenomenon of cooling, it has been found that when water cools it gives off heat. For each drop of one degree Fahrenheit, a pound of water gives off one BTU (British Thermal Unit) of heat. For each degree it rises, it absorbs one BTU of heat. But water undergoes a radical transformation when it cools to 32 degrees; it solidifies, turns into ice. And when this change occurs, water releases an enormous amount of heat. At that moment when it changes from a liquid to a solid, a pound of water gives off 144 BTU's of heat. As W. S. Rogers, an English agricultural scientist, put it, "If one thousand gallons of water, at the freezing point, turns into ice in the orchard, as much heat is given off as if eight hundred gallons of boiling water had been brought to the orchard and allowed to cool to the freezing point."

Professor Earnest Kidder, of Michigan State University, one of America's experts on frost control, said, "Most laymen find it hard to believe how much heat water gives off when it changes to ice, but farmers shouldn't be so surprised. Most farmers, when they were kids, have done what I used to have to do, carry tubs of snow in to the kitchen range to melt for soft water. If they will just remember how much heat it took to melt the snow and realize that water gives up just that same amount of heat when it freezes, they will realize why the constant formation of ice from the sprinkler system protects the growing plants."

Another factor which helps plants withstand this glacial protection is that they have, as a rule, a lower freezing point than does water. Where the water that sprinkles over them freezes at 32 degrees, most of the truck crops can remain undamaged at temperatures slightly lower depending on the growth stage and their natural hardiness—the chemical make-up of their sap acting as natural antifreeze.

These two physical qualities, the release of heat by freezing water and the ability of plants to withstand temperatures below 32 degrees without damage, have made it possible for Frank Deaner and other farmers to use their irrigation systems to sprinkle their truck crops through the dangerous frosts of spring and to prolong the growing season beyond the first killing frosts of fall. During the summer, the systems are used to fight another natural menace, drouth.

While Deaner was sprinkling his strawberries, other growers were using irrigation to protect tomatoes, grapes, peppers, beans, cranberries, peas, broccoli, squash, and cucumbers—and there is nothing cooler than an ice-coated cucumber. Some of these growers have been using their irrigation system for frost protection both in the spring and in the fall; planting a part of their crop two to three weeks earlier than usual to take advantage of the high prices for the early crop and extending the season in the fall to benefit from the price jump which inevitably follows the first killing frost.

Grape growers have found that icing over their vines pays off in the spring, but in the fall, when the vines are loaded with grapes and leaves, the extra weight of the ice may do more wire-breaking damage than it is worth. This same problem faces the farmers who grow taller plants. Irrigation will protect fruit trees, sweet corn, celery, gladiolus, hyacinth, chrysanthemums, and hydrangeas; it has been used on all of them successfully during a light frost when little ice was formed, but the amount of ice formed during a deep frost may do more damage by weight than the cold would have done.

On May 11th, when the strawberries had emerged from their slush and Deaner shut off the pump, the low-growing plants had survived a temperature of 26 degrees. Though this was not the lowest temperature Deaner had ever overcome—in 1954, the first year he used irrigation for frost control, he had used the system 17 different nights and successfully battled temperatures as low as 20 degrees—it was low enough to have wiped out his whole crop. Michigan State University has reported strawberries protected at temperatures as low as 18 degrees and tomatoes were saved from 20-degree frosts. The important thing to Deaner and other growers is that even a light frost can kill the blossoms which produce the crop—and with strawberries, which must be set out

(*Continued on page* 86)

Pole beans covered with ice will survive at temperatures as low as 20 degrees, but the weight of the ice will probably do as much damage as the cold. Irrigation is recommended for low-growing plants such as the onions and peppers shown on the opposite page.

The Christmas Program

All roads led to the schoolhouse on program night. Everybody had a hand in the program, but it was a night of glory for the kids

By Marion C. Seddon

The bleak schoolhouse blazed with light and color on this one big night of the year.

Most performers needed help with their makeup, but some bravely insisted upon helping themselves.

BEFORE THANKSGIVING most of us at Loon Lake School had our Christmas pieces memorized. For weeks we happily drilled and rehearsed. Classes were cut short for practice, and the last few days before the grand finale they were abandoned.

Outside talent was invited to take part in the program—fact is, you couldn't keep it out. Little brothers and sisters, too young for school, were given pieces or had stand-in parts. And on Program Night, no matter how inaudibly they lisped their lines, it was they who stole the show.

As the great day grew nearer marvelous changes came over our bleak school room. Cloak-rooms became fascinating dressing rooms. Piled high on the lunch-box shelves were Santa suits, Mother Goose costumes, brownie outfits, wigs, masks, angel-gowns, and mysterious scenery props. Our lunch pails were stowed on the floor amid the dripping boots and overshoes.

About the curtainless windows dangled paper chains, and red and green ribbons festooned the ceiling in intricate loops, braids and swirls. The black-boards had a bright border of poinsettias, laboriously cut out, colored, and put up with flower and water paste.

George Washington's portrait was gaily fringed with boughs of evergreen and President McKinley's heavy-browed visage stared from among clusters of silver icicles. On the back wall the big clock's dignity, though not its face, disappeared in a tangle of tinsel.

The trimming of the tree, dragged in by the older boys from a near-by woods, was an all-grade activity. And proudly the graceful green boughs of the tall hemlock bore their burden of baubles, tarnished tinsel, and strings of popcorn and cranberries.

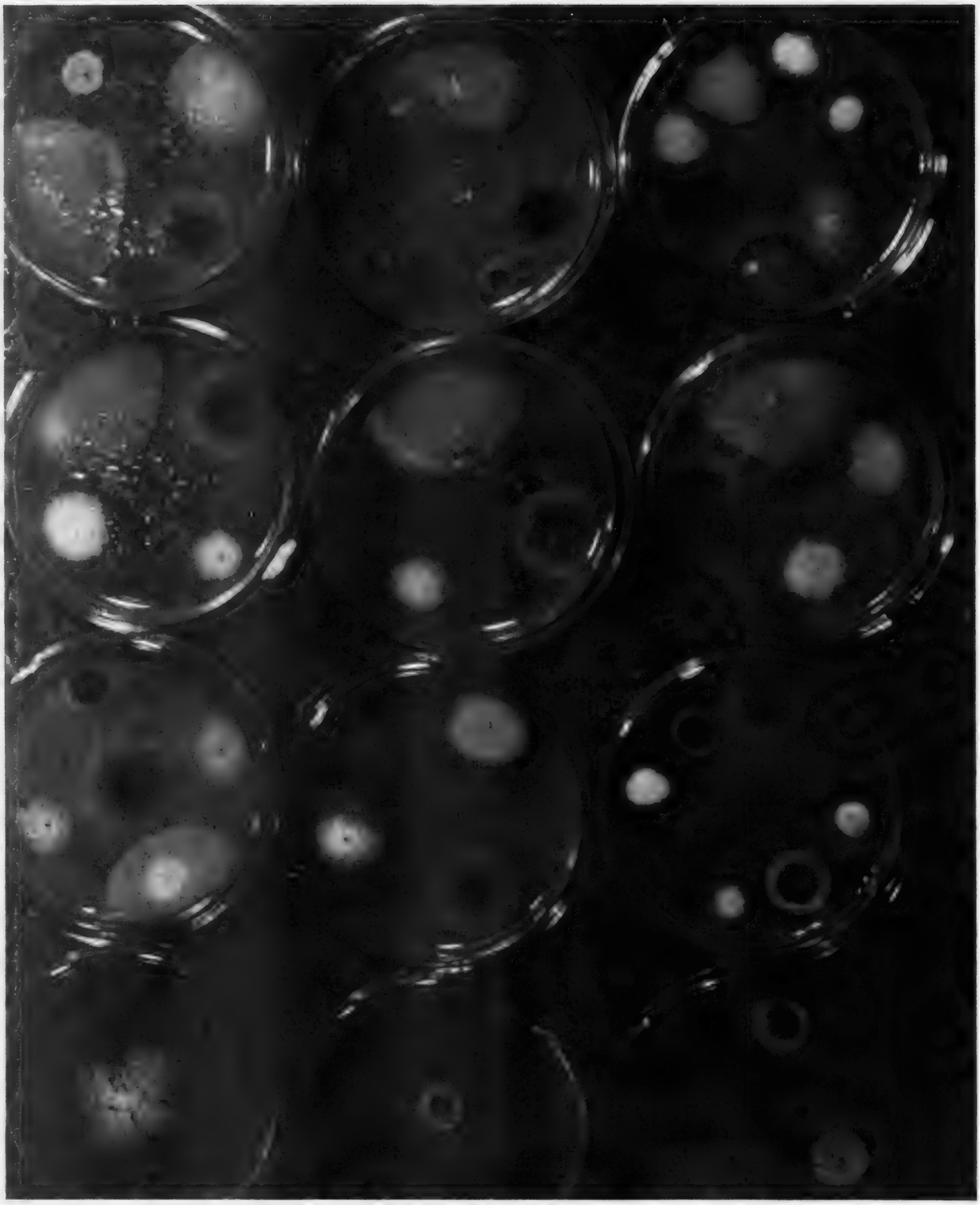
The tree-trimming, though tremendously important, could not compare with the building of the plank platform. The noise of those pounding hammers was more than music to our ears! It was the roll of drums presaging our wondrous affair.

Then the bed sheet curtains were put up, strung on a taut wire with safety pins. The teacher selected the most reliable sixth grader in the class to draw the curtains that night. He was envied by all.

There was tension in the very air. The last day or two before the Night it almost reached the breaking point. Youngsters became a bit hysterical and the teacher turned on all her self-control. She usually broke when some young performer, after rendering his piece, made a graceful bow, and forgot he was standing on a platform.

But along in the late afternoon everything settled down to a tense calmness. We bundled up for our walk home, turned at the door and looked back on the exciting scene where soon a great drama was to unfold. "See you tonight," we said to our friends. Our words were intended to be heavy with portentous meaning. For were we not, all of us, conspirators on the brink of a great adventure?

(*Continued on page* 127)



This is antibiotic screening, the first step in the search for new antibiotics. Promising molds are allowed to develop in the presence of disease germs. The "rings of inhibition" which form around some of the molds are areas where the germs are unable to grow, indicating that the antibiotic produced by the mold will inhibit bacterial growth and merits further testing.

1. What Are Antibiotics?

2. How Do They Work?

3. Can the Farmer Use Them Effectively?

Quiz on ANTIBIOTICS

By Charles R. Koch

ANTIBIOTIC HAS BECOME a familiar word to the farmer. He uses antibiotics as drugs in the treatment of livestock diseases; he uses them in feeds to promote growth; he is beginning to use them to fight crop diseases. Yet, for all his glibness in talking about them and the casual manner in which he feeds them to his livestock, his knowledge of what they are, how they work, or exactly what they can be expected to do, is extremely meager.

He can't be criticized for this shortcoming. Even the scientists who are devoting their lives to antibiotics, the doctors and veterinarians and nutritionists who have adopted them as some of their most important tools, are unable to give a definite answer to many of the questions.

We offer this quiz in an effort to set the record straight on the fundamentals involved so that the farmer can use antibiotics in an intelligent manner and to protect him from falling prey to the unscrupulous peddlers of fake wonder drugs.

Q. What are Antibiotics?

A. Strictly speaking, a gun, a bullet, a knife, any poisonous liquid or gas, or a host of other things are antibiotics, for antibiotic is a term derived from two Greek words, *anti,* meaning against, and *Bios,* life. Thus, anything which is against life is an anti-biotic. But in the restricted sense, which is also the popular sense, antibiotics are chemical substances produced by microorganisms which stop the growth or reproduction of, and even destroy, other microorganisms.

Q. What kinds of microorganisms produce antibiotics?

A. Numerous organisms produce them. In the teeming unseen world of microorganisms a constant struggle goes on for survival, with never-ending competition among microscopic living creatures for their food supply. They wage continual war against each other with antibiotics as their weapons. For practical purposes scientists have found that the most efficient producers of antibiotics are molds, yeasts, bacteria, and actinomycetes, a kind of mold-bacteria.

Q. Where are antibiotic producing organisms found?

A. They are found everywhere; in the air, in the soil, in water. Their ubiquity gave substance to such ancient remedies as putting cobwebs on open wounds and applying bread poultices to boils. Often the very antibiotic needed to effect the cure was produced by the bacteria or mold which happened to be present on the cobweb or the bread.

Q. The antibiotics, then, act just about like disinfectants such as alcohol or Mercurochrome, which sterilize a wound and kill the germs around it?

A. No. The antibiotics act somewhat differently than disinfectants. Generally speaking they do not kill the germs but inhibit their growth. Laboratory workers who are continually searching for new antibiotics are always on the alert for what they call the "rings of inhibition" which are the tell-tale signs in the petri dish indicating that the organism originally introduced there has attacked another which was subsequently introduced. The "rings of inhibition" are areas where nothing at all has grown, but there is still an abundance of microscopic life elsewhere on the dish, which would not be the case had a disinfectant been used. It is true that some of the antibiotics do kill germs. They are called bactericidal. Penicillin, one of the better known of the antibiotics, is bactericidal to some germs. But in the concentration in which they are commonly used most of the antibiotics are bacteriostatic, meaning that they suppress the growth and aggressiveness of germs.

How They Work

Q. How do the antibiotics accomplish this task?

A. If we could answer that one we could immediately take our place among science's immortals. But there are a number of interesting theories. One school of thought holds that the antibiotics limit the oxygen intake of young bacteria and are thus effective in checking their propagation. Another theory is that they starve the germs by depriving them of their food supply. And some antibiotics, penicillin, for example, seem to have the ability to dissolve certain types of bacteria.

Q. We have heard much about sulfa drugs. What is their relation to the antibiotics?

A. Broadly speaking, sulfa drugs are antibiotics in that they, too, attack disease-causing bacteria. But in the strict sense they are not what we are speaking of here as antibiotics. The true antibiotics are organic compounds, the products of living microorganisms. The sulfa drugs are synthetic antibiotics, if you will, manufactured by man from organic chemicals.

Q. Isn't it true that the antibiotics, too, are now manufactured on a wholesale scale in pharmaceutical plants?

A. Yes. But the process is bio-chemical rather than a purely chemical process. It is an amplification of what goes on in the laboratory. The organisms which produce the antibiotics are started in "seed tanks" and are then introduced into huge vats of nutrients much as they might be placed in flasks in the laboratory. After the microorganisms have completed their growth, the liquid is drawn off from the mass of the mold and the antibiotic is extracted from the liquid.

Q. Give us a little of the background on the discovery of the antibiotics.

A. Actually, man has been working with these materials from the earliest times. The ancients who mastered the art of brewing, the wine makers of the middle ages, worked with yeasts which produced antibiotics in fermentation. But they were unaware of what they held in their hands. Then just 100 years ago, in 1857, Pasteur, working with microscope and test tube, definitely charted the course of fermentation and proved that these chemical changes are effected by living cells. From this work he concluded that diseases could be cured by setting microbes against one another.

As early as 1901, the world's first antibiotic, pyocyanase, was isolated. But the

manufacturing techniques were so poorly developed at that time that production of the drug could not be sufficiently controlled; consequently it proved toxic and unstable.

In the history of antibiotics the year 1928 is analogous to the year 1492 in American History. It was in that year that the British scientist, Sir Alexander Fleming, stumbled upon the mold *Penicillium notatum*. It had accidentally been blown onto a petri dish in which Fleming was trying to grow a certain bacteria and immediately proceeded to arrest the growth of those bacteria. From this mold Fleming patiently extracted the first penicillin.

Eleven years later, on the eve of World War II, H. W. Florey and E. B. Chain, two other English bacteriologists, were still working with this mold, laboriously extracting 1 part of penicillin from 1 million parts of fermentation broth. Actually this was a tougher job than taking gold from sea water. But they proved that penicillin was a tremendous weapon in the fight against human disease. The outbreak of the war spurred their efforts to find a more efficient way to produce the drug and also transferred their activity to the United States.

Here they continued their work at the Northern Regional Research Laboratory of the United States Department of Agriculture in Peoria. It was in Peoria that

a research worker found a canteloupe with the mold, *Penicillium chrysogenum*, which had the ability to produce 200 times as much penicillin as Fleming's *Penicillium notatum*. This was the beginning of the antibiotic industry.

Powerful as penicillin proved to be, its effectiveness is limited mainly to Gram-positive bacteria (bacteria which can be stained by a method developed by one Christian Gram) and it is specific for only about 25 diseases. So the search went on for other antibiotics.

The same year that Florey and Chain proved the effectiveness of penicillin in human therapy, Dr. Rene Dubos also discovered the antibiotic tyrothricin. This one proved so toxic, however, that it could be used only for the treatment of surface cuts and abrasions.

Antibiotics give a boost to hog rations. They control secondary infection caused by the microorganisms shown at the left. Starting top center and reading clockwise are : protozoa, yeasts, fungi, Gram positive bacilli, anaerobes, Gram positive cocci, Gram negative cocci, Gram negative bacilli, spirochaetes, rickettsia and large virus.

In 1944 Dr. Selman Waksman, of Rutgers University, isolated streptomycin from an actinomycete he found in the soil and in the throat of a chicken. Streptomycin established itself as a powerful weapon against many of the Gram-negative bacteria and against the germ which causes tuberculosis. Aureomycin, which derived its name from its golden color, was discovered by Drs. B. M. Duggar and C. W. Hesseltine of the Lederle Laboratories in 1948. Then, in 1949 workers at the Pfizer laboratories discovered terramycin (terramycin is a trade name for the antibiotic oxytetracycline) which is a product of the mold *Streptomyces rimosus* and is effective against almost 100 diseases including those caused by some of the Gram-negative as well as Gram-positive bacteria, typhus, Rocky Mountain fever, and even against some of the larger of the virus-like microorganisms which cause parrot fever and primary atypical pneumonia.

And the search still goes on. Hundreds of antibiotics have been discovered, but only a very few are of any value in medicine or agriculture. The remainder are worthless because of toxicity, instability, or production problems.

Q. What are the principal antibiotics used in medicine and agriculture?

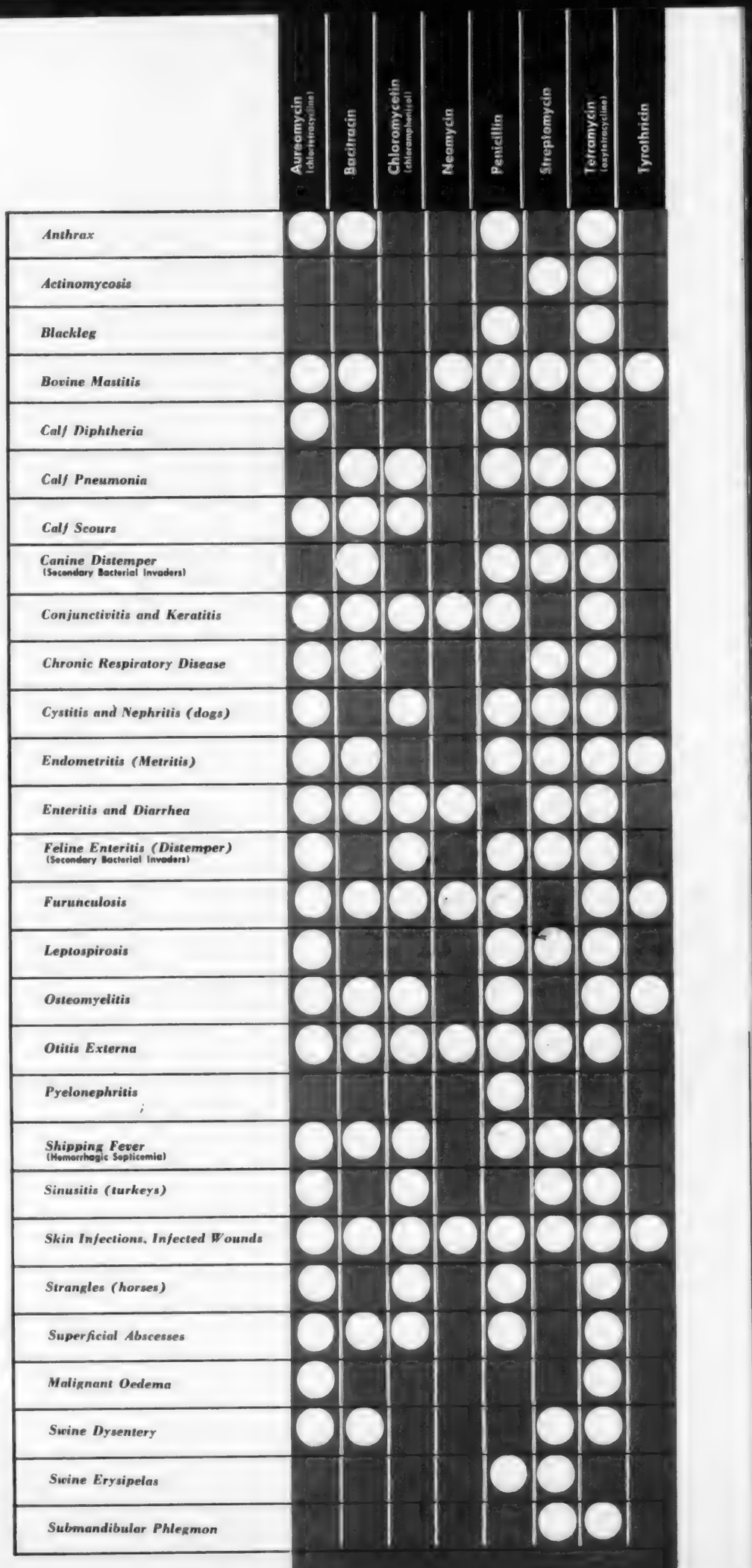
A. Aureomycin, bacitracin, chloromycetin, neomycin, penicillin, polymyxin, streptomycin, terramycin, tetracycline and tyrothricin.

Q. Are all these antibiotics equally effective?

A. No. Each of them is specific against a particular disease or group of diseases although they over-lap in their ranges. None of them act universally. For a list of the diseases against which the various antibiotics are effective see the chart on page 47. Bacitracin and penicillin, for example, are effective mainly against Gram positive organisms and have a relatively narrow range. Aureomycin, terramycin, tetracycline and chloromycetin are among those referred to as broad spectrum antibiotics. They are effective against many of the Gram negative bacteria as well as the Gram positive bacteria and also attack many of the large virus-like, disease-causing agents. This does not mean that the broad spectrum antibiotics are necessarily more efficient in any particular case.

Currently, this matter of the "selectivity" of certain antibiotics and the comparative efficiency of broad spectrum and narrow spectrum types is a highly debatable question. There is even considerable dif-

Here are eight antibiotics and the animal diseases against which they are effective. This chart is an approximation of the somewhat conflicting claims made by drug manufacturers and veterinarians for specific uses of the antibiotics indicated. This is understandable, since research is continuing in this field and new uses and properties of these drugs are being turned up daily.



ference of opinion among the scientists as to the function of the various microbes found in livestock. For example, in discussing the control of CRD in poultry a very reputable biologist recently said, "To control CRD keep *E. coli* out of the intestinal tract." Another, equally well thought of, stated that "*E. coli* are not dangerous as long as they are in the intestinal tract. If they are knocked out, dangerous yeasts, molds or fungi may move in."

Q. Are scientists agreed on the application, uses and effectiveness of the various antibiotics?

A. Up to a certain point they are; but there is considerable difference of opinion when it comes down to specific cases. For example, one group of authorities contends that antibiotic X is effective against actinomycosis. Others say that its effect against this disease is apparent only when used at almost toxic levels. Again, research in this field is so concentrated and exhaustive that new antibiotics are constantly coming to hand and new uses are being discovered for the more familiar ones. In such a rapidly expanding field there will naturally be conflicting claims.

Q. I have seen the term tetracycline-type antibiotics used in some of the advertising literature. What does this mean?

A. The tetracycline-type antibiotics are aureomycin, terramycin and tetracycline. They are broad spectrum antibiotics.

Q. Veterinarians talk about dosing an animal with so many "units" of antibiotics. What is this unit?

A. In most instances the unit of activity of the antibiotic chemicals is directly correlated with weight and one unit equals 1 microgram (one-millionth of a gram). However, this is not true of penicillin, bacitracin and polymyxin; in referring to these antibiotics the unit denotes their ability to inhibit a certain number of microorganisms.

Q. Are there any animal diseases against which antibiotics are not effective?

A. Yes, definitely. Antibiotics are not effective against hog cholera, distemper, rabies, foot and mouth disease, and Newcastle disease, among others. These diseases are caused by small viruses against which the antibiotics are ineffective. Vaccination, isolation and sanitation are still the only weapons with which to fight them.

Not Effective Against Small Viruses

Q. Why are the antibiotics of no use against the small viruses?

A. This is another of those impon-

(Continued on page 88)

Artificial rumens convert roughage into feed that can be digested by pigs, chickens, or even man

Ruminating In A Barrel

IN THE PIG PENS and the chicken coops of the Missouri Agricultural Experiment Station, scientists are testing a new feeding technique and new feed stuff which may revolutionize our whole concept of feeding the non-ruminants such as poultry and swine. In a pinch, it may also be used to feed that most important of all non-ruminants, man. Corn cobs, molasses, and urea, which will keep a cow or sheep alive, but are about as nutritious as scrap iron to a non-ruminant, are being converted into useable feed by putting them through a fermentation process in an artificial rumen. This artificial paunch takes the place of the natural fermentation vat that is the first, and by far the largest, of the stomachs of cows, sheep, goats, camels, and other ruminants. If these scientists had suddenly found that you could use sea water in place of gasoline their findings could hardly be more significant, for nitrogen, an important element in urea, and cellulose, which is the main component of corn cobs, stalks and straw, are two of the earth's most plentiful materials.

During the past decade, we have learned that the billions of bacteria that live and work in the rumen are able to live on nitrogen in the form of urea or one of the ammonia compounds and convert it into useable protein which the animal is then able to digest in its fourth stomach—which is very little different from the stomach of the non-ruminant. These same bacteria also break down the fibrous cellulose of straw and corn cobs and transform it, too, into a digestible feed. This ability of the ruminant has made it possible to fatten cattle and sheep on feed which we literally pull from the air—since the air is 80 per cent nitrogen—plus roughage which we once considered filler or undigestible fiber.

Now, a group of scientists led by Dr. M. E. Muhrer, an agricultural chemist, and Dr. W. H. Pfander, an able, young nutritionist, are showing that the fermentation which converts these crude materials into digestible feeds in the cow's rumen can do the same job in an artificial rumen. They are also proving that once feed is fermented and passes out of the rumen, it is just as digestible by pigs and chickens as it is by cows or sheep. They have not tried eating the fermented feed themselves, but it is generally agreed that any thing that man can eat the omnivorous pig can also eat and vice versa.

"We started this project," Dr. Muhrer said, "in an effort to throw more light on the complex problem of rumen fermentation. We know that in the rumen great quantities of feed are fermented by uncounted millions of bacteria of many different kinds. Some of these bacteria we know, but no one has sorted out all of the varieties that make up the population in a single rumen. We do know that there is a shift in numbers of the different kinds as the feed of the animal is changed—one group of bacteria being dominant when the cow is on one kind of feed, say roughage, while other families of bacteria will be in the majority when the animal is on concentrates. We also know that by working on cellulose materials these microscopic, single-celled organisms are able to convert the fiber into digestible crude carbohydrates. Recently, we found that these bacteria are able to live on nitrogenous materials that we usually think of as fertilizers. The bacteria consume the nitrogen and multiply and die. The dead bacteria become the protein feed that the cow digests. And somehow in their life cycle the bacteria synthesize most if not all of the B vitamins. The important vitamin B_{12}, you may remember, was discovered in cow manure at about the same time that it was found to be produced by the organisms that make antibiotics."

The inoculant for the artificial rumen is drawn from a sheep or steer's paunch. The incision, a fistula, is painless.

In order to have a constant supply of the rumen organisms, Dr. E. F. Ebert, a skilled surgeon in the School of Veterinary Medicine, operated on a runt steer named Shorty and on a flock of sheep and goats to produce fistulas, which are openings directly into the rumen of the animal. Once the fistula is healed and a plug inserted, the animal goes right on about its business with no pain or discomfort. "It's a little difficult for most people to believe that an animal can go on functioning normally while we fiddle around in its insides," Dr. Pfander said, "but it's actually true. An English friend of mine, C. C. Balch, had a fistulated cow so well trained that when he was making

a study of grazing habits, she let him walk along beside her in the pasture with his arm inside her. As she grazed contentedly, he would snatch each bite as it entered the rumen and later he was able to analyze every mouthful of grass."

In the gray stone building that houses the agricultural chemistry department, Muhrer and G. B. Garner, a graduate student, set up their first artificial rumen —a glass jar immersed in a bath of warm water to keep it at body temperature. Into this they dumped the feed to be studied, gave their artificial stomach a drink of water, and inoculated it with the juices taken from Shorty's rumen. Carbon dioxide gas was bubbled through the mass to drive out the oxygen, since oxygen permits the bacteria of putrefaction to flourish; then the jar was sealed. The contents were stirred electrically and tests were made from time to time to determine the acidity. When the acids, which the bacteria form, grew too high, artificial saliva was poured in to neutralize them and keep the material between a pH of 6 and 7.

At the end of 24 hours of fermenting, the feed in the jar was a wet mash of about the consistency of cow manure. This material was then put through the complex laboratory tests which chemists use to determine its make-up. The first tests—repeated many times to be sure that they were getting consistent results—showed that though no trace of vitamin B_{12} could be detected in the original feed, the fermented feed had enough B_{12} to meet the recommended levels for chickens and pigs. They also found that the urea which was used in the original feed had been converted during fermentation and was replaced by bacterial protein—the protein content being raised as much as 10 to 15 per cent. And finally, they found that the fat content of the feed was doubled by the bacterial action which converted carbohydrates into fats.

Having proved that the functions of a rumen could be duplicated artificially, the next step was to build a rumen big enough to produce feed for a few pigs.

For this job Dr. Muhrer used a 55-gallon drum set in a stock watering tank which was heated electrically to provide the proper warmth. He found that in this larger container the bubbling gasses released by the bacteria did away with the necessity for stirring—the rumen stirred itself by belching which is the same force that brings the cud from the rumen to the cow's mouth. Once the barrel rumen was inoculated with bacteria from a living animal, the following batches of feed were fermented by leaving a residue of a little of the working material after each batch to inoculate the next. The only time this procedure was changed was when the barrel rumen got off its feed and began to smell bad—then they knew that an undesirable group of bacteria had taken over and that the barrel needed cleaning and reinoculating.

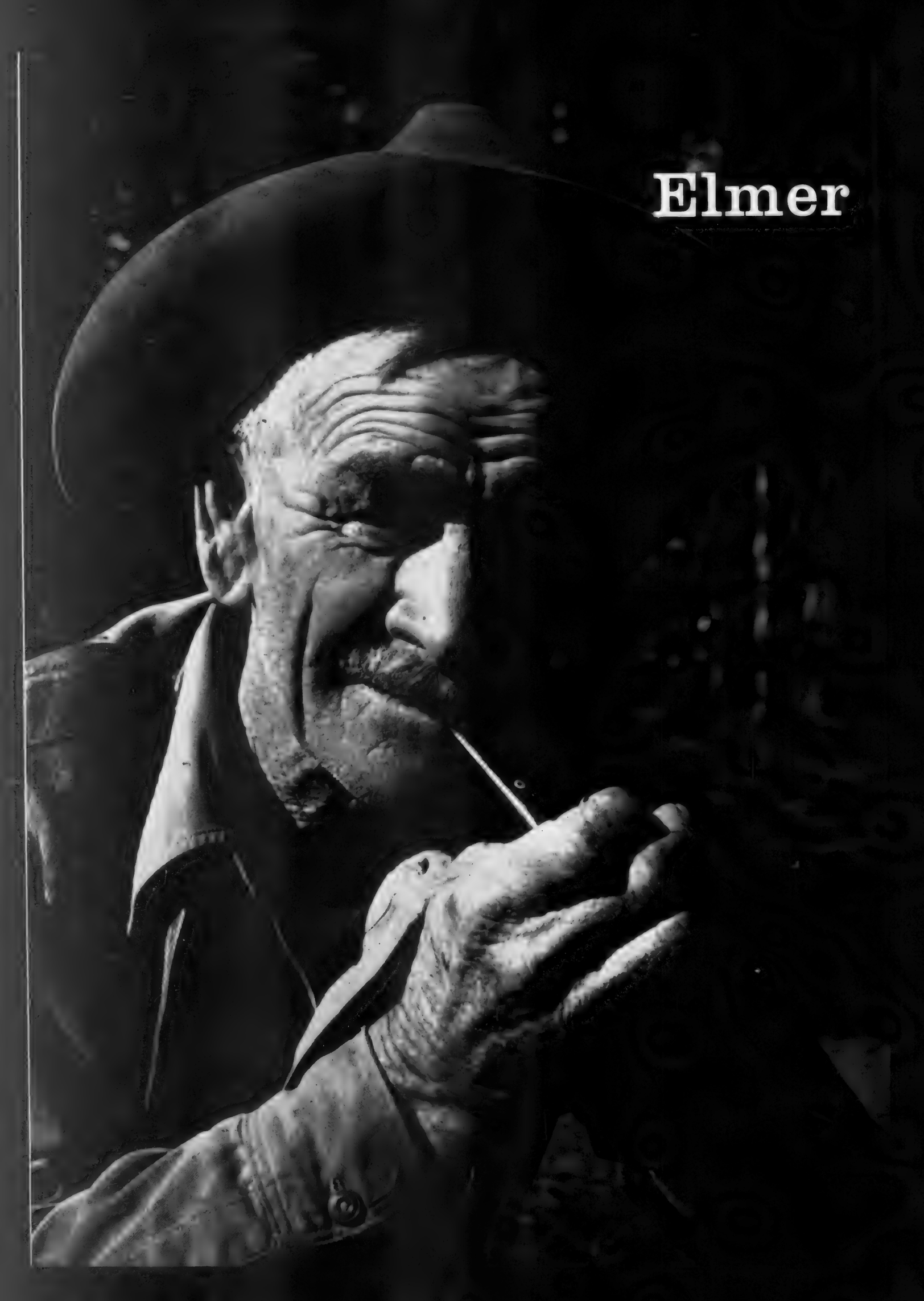
In selecting feeds to be tested in the barrel rumen, the Missouri scientists decided to try to up-grade poor feeds rather than to try to convert a feed that would not support life into a ration that would keep the pigs alive. To feed the rumen they mixed a batch of 250 pounds of corn and cob meal, 200 pounds of alfalfa meal, 100 pounds of wheat shorts, 25 pounds of dried buttermilk, 300 pounds of linseed oil meal, 65 pounds of urea, 25 pounds of distillers dried solubles, 25 pounds of ground limestone, 50 pounds of ammonium sulphate, 10 pounds of salt, and 50 grams of cobalt chloride. Each day a batch of this poor pig feed was fermented in the rumen and then fed with corn to one group of pigs at the ratio of three-quarters corn to one-quarter dry weight of the fermented feed. Another group of pigs were fed the same ration except that the mixed feed was not fermented. The pigs on the unfermented feed gained at the rate of 1.09 pounds per day and took 459 pounds of feed to make a 100-pound gain. The pigs that were given the rumen-treated feed gained 1.36 pounds a day and used only 368 pounds of feed for each 100 pounds gain. Both groups of pigs started the test weighing around 100 pounds and were fed for 40 days. In a 45-day test with pigs starting at around 130 pounds, the pigs on unfermented feed gained 1.17 pounds a day and used 506 pounds of feed for each 100 pounds of gain while the pigs on fermented feed gained 1.49 pounds a day and made their gains at the economical rate of 383 pounds per 100 pounds gain. A test with chickens showed that fermenting made the difference between chicks that gained 109 grams in 4 weeks and those that put on 179 grams.

A number of similar feeding tests have confirmed these findings, but these tests have not been easy to make. In the first place the project has been run on a part-time basis by these men who are also teaching and doing other scientific work

(*Continued on page* 100)

Dr. M. E. Muhrer uses two types of artificial rumen. The small, glass rumen (shown at top of opposite page) produces chicken feed; the steel barrels (below) ferment feed for pigs.

The pigs on test eat the pre-digested feed with relish and prove its digestibility by their gains. These pigs made 27 per cent greater gains than control pigs on non-fermented feed.


Elmer

and the Winter Woodpile

By Stoyan Christowe

ELMER AND I ARE a couple of die-hards when it comes to sawing wood. Not that we have anything against the chain saw, which can mess up enough wood in a day to last you a year. We both admit the chain saw is a great invention, and a boon to loggers, but we like sawing wood by hand, the way people like to fish or hunt, and we have plenty of time, both of us. No one is pushing us, and we like to talk while we saw wood. With a chain saw you can't hear your own voice, let alone the other fellow's.

Shuttling rhythmically between us, our saw hums a drowsy, rocking lullaby. The clearers rake away the sawdust and winnow it out into neat little piles. The whole of nature murmurs with our saw. All about us the air teems with myriad insects, mesmerized by the warm, yellow sunlight. And the foliage is at its height, with the stands of dark-green spruces among the riotous maple colors, suggesting the presence within of dream-like palaces.

"Best time o' year to saw your wood." Elmer's nasal twang blends with the thrumming of the saw. "Fell your trees and limb 'em while the sap's still in the leaves. Then the logs saw better and your wood dries faster." Little capsules of folk knowledge transmitted by Green Mountain generations survive in Elmer.

If it hadn't been for sawing wood by hand, I would never have come to know Elmer as well as I do. For years now Elmer has been helping me saw my winter wood. I say help, but it really is the other way around. Though I pay Elmer and board him (Elmer will not work for you unless you board and lodge him), he is the boss, the officiating high priest of these autumnal rites. Out of the maple, beech, yellow-birch, black-cherry logs snaked in the yard in front of the woodshed Elmer and I make music, with a crosscut saw as our only instrument, aided by a few saw-wedges, a couple of axes, a light sledge, and two or three flat files.

The yellow-birch log we're now bucking shivers and causes the saw to shiver with it. For some reason the two smaller logs resting against it do not seem to hold it in place. We cannot maintain the needed coordination between muscle and metal which is the essence of enjoyable sawing.

"Restless, she is," Elmer mutters churlishly. Without straightening his body he reaches for the axe and slivers off a small wedge from a nearby log. This he "shims" in between the log and the skid nearest the thick end.

"That'll make her stay to home," says Elmer vindictively, as if the log were an ornery, testy woman who must be held steady for her own and everybody else's good.

The saw takes up its happy song again. Yellow-birch saws easier than maple and the unimpeded saw takes greedy bites out of the less resisting wood. There's an easy, effortless swing to the arm, but the sawing lacks the finer-grained, cleaner cut of maple. Still the sawyer's enjoyment is not diminished, for yellow-birch is not gushy like balsam, which stifles the saw with pulpy, excelsior-like sawdust and waxes it with its gummy bark.

Sawing wood hasn't hurt Elmer any. On the shady side of seventy, he is ageless. Somewhere between fifty and sixty he got cast into a mold that still retains its form and hardness. He lives alone, raising potatoes, beans, pumpkins, sugaring a little, berrying in season, water-witching for summer folk, linin' bees in the fall, and sawing wood, not so much now as he used to, but still preferring that to any other chore.

"You still pestered by hedgehogs?" This was a sly allusion to my city naiveness when I first came up to Vermont. I had thought then that the hedgehogs nested under the sills of the old fallen barn, and that they came out at night to keep us awake with their noisy carpentering. I had killed at least a score of them, and still there were more. Then Elmer enlightened me. They didn't live under the barn, they came from the woods.

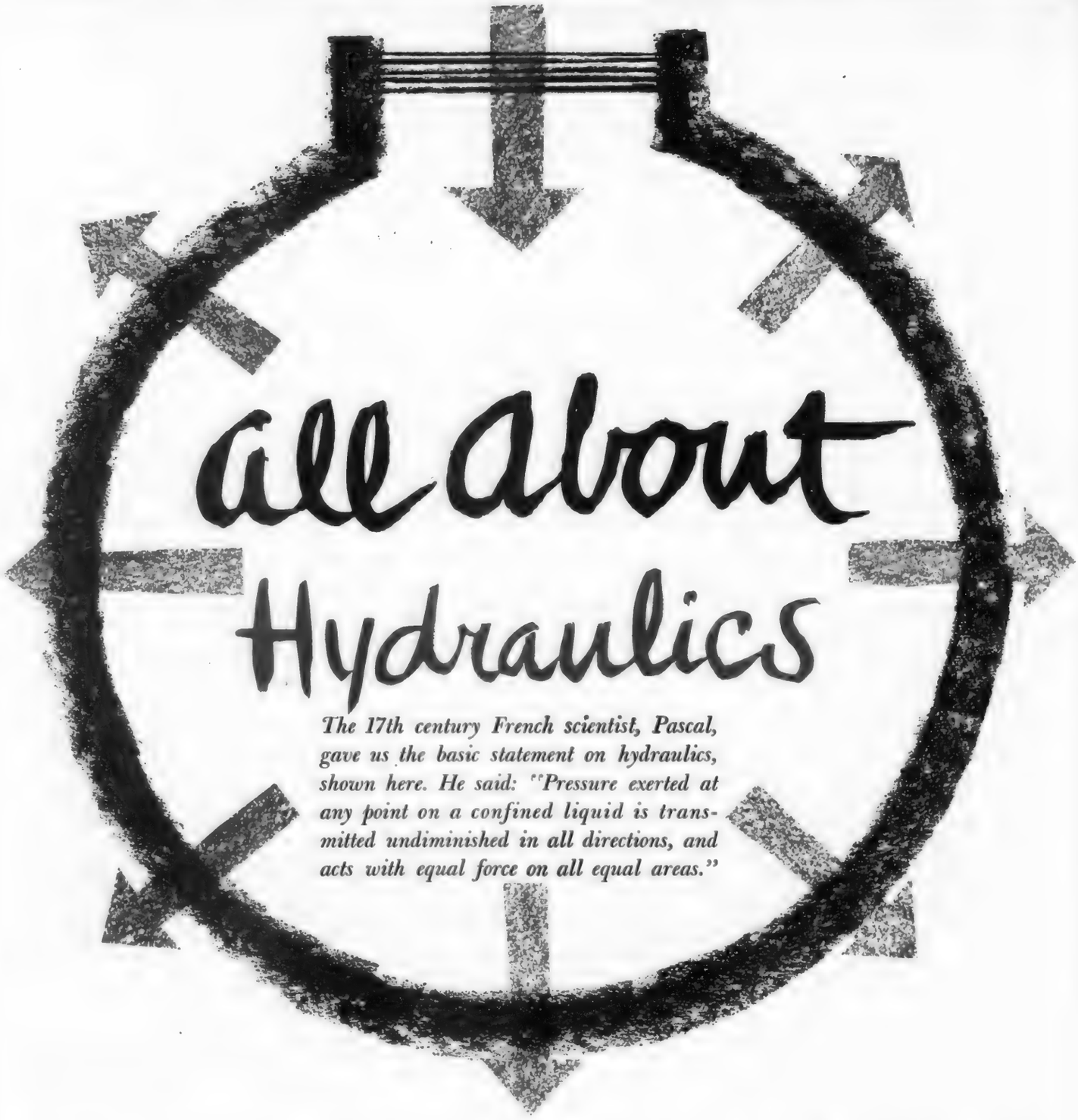
"Then what's the sense in killing them? No matter how many I kill there'll be more to come."

"Certain, certain, but them as you kill won't come back."

That was when Elmer began to take on dimension. I knew him slightly then. To me he was much like a piece of the Vermont scenery, a poke weed on the Green Mountain landscape. But as we sawed wood season after season Elmer took on stature. Grain by grain his character sifted out, until there it was, a meaningful little pile, like the sawdust from a knot in the wood.

Again the easy rhythm of the saw is suddenly lost to us. The saw's teeth grate, the blade itself trembles. The sawdust no longer flows out but spits out in separate motes. Elmer inserts a wedge in the crack. Still the saw drags on the arm, whines like a pup. It's not the labor we mind, it's the knot's insinuation into the rhythm of the muscles, into the saw's respiration. But we keep at it, and in a minute or two we cut through the knot; and the saw again breezes hungrily, its teeth grinding out the

(*Continued on page* 97)



all about Hydraulics

The 17th century French scientist, Pascal, gave us the basic statement on hydraulics, shown here. He said: "Pressure exerted at any point on a confined liquid is transmitted undiminished in all directions, and acts with equal force on all equal areas."

LIKE A LOT of other young farmers, Tom Eastman of near Mason City, Iowa, has built his farming program around his tractor and the way he can multiply manpower with the hydraulic attachments for it. When he talks about hydraulic power he points to the hair-trigger control valve just under his tractor seat. A flip back and the scoop comes up, forward and it floats down. "I wouldn't do without these tools—or rather I couldn't do the amount of farming that I do without them. Take this morning . . . I can handle the scoop pretty fast . . . I loaded two tons of grass silage out of the trench. Then I picked up the self-feeding wagon with the hitch and ran it under the grain bins in the barn, dropped 200 pounds of grain down on top of the silage and drove out to the lot where I unloaded the wagon into the feed bunks. The total feeding time, including loading the silage, was less than half an hour.

"I had a little time left so I switched the scoop for a blade and pushed the manure all off the slab. Then I put the manure fork back on. I picked up the manure and dumped it into the spreader. Without changing a thing on the tractor I picked up the spreader and took it out to the 40-acre field next to the barn lot. I like to get the manure off the slab every day that it isn't frozen; it will usually make two loads. Before I had these power tools on the tractor all of this would have been a half a day's work, but this morning I went into breakfast just as the kids were getting on the school bus, at 7:30."

A Quick Look at Pascal's Law

The chances are if you mention "Pascal" to most people, they will think you are talking about bright-green celery. However, any engineer will tell you how important the name "Pascal" is to the farmer. For it was this 17th Century French scientist's work with matter in each of its three states—gas, liquid, and solid—which gave us our basic understanding of how each of them can be counted on to react when we squeeze them, poke them, or release them from captivity. Gas is the tricky one: some-

Hydraulic controls and power for implements have become part of the farmer's team. Where else can you hire a farmhand for life who can lift 5 tons on a second's notice?

times you see it, sometimes you don't. Gas is used as a farm worker for welding (as oxygen and acetylene), for fertilizer (as ammonia), and it is very useful—keeps us alive when we breathe the most abundant of all combinations of gases—fresh air. The solids, like wood and metal, shelter us or ride us around in air-foam luxury when we propel the solids like iron and steel with one of our best-known liquids, gasoline.

Pascal noted many of the natural laws that made possible the taming and putting to work of the gases, liquids, and solids. He noted that *gases* and *liquids* both will flow, and when confined and subjected to force, they will transmit that force as pressure, equally in all directions. He found that *liquids* and *solids* have qualities in common. Both are incompressible and when subjected to force they transmit that force undiminished. *Liquids,* therefore, possess qualities that are common to both gases and solids. They are *fluid* as well as *incompressible,* and we could say that they combine the most useful qualities of both gases and solids. The engineer often considers liquids as *fluid solids.*

Pascal summed it all up in his law which we define like this: "Pressure exerted at any point on a confined liquid is transmitted undiminished in all directions, and acts with equal force on all equal areas." Just how important that turns out to be to the farmer can be seen in the diagrams shown below. These diagrams illustrate the second part of the law, which states that pressure "acts with equal force on all equal areas." We find that we are able to magnify force by simply making the working end of a hydraulic machine a lot bigger than the other end, which activates the liquid. This is one of nature's surprises. Notice how a good stout piece of metal transmits only the same force that is put on it at the other end, while the liquid multiplies the force by 10 times.

Now let's look at the first part of the law which states that the liquid transmits pressure "undiminished in all directions." This gives us our clue on the flexibility of hydraulic power transmissions. It will go up and down and around corners, through all kinds of twists and turns of pipe. These are some of the ways that liquids behave. Almost any kind of fluid can be used in a hydraulic system. For farm uses oil is the fluid that is in common use. Hydraulic oil in itself is a lubricant, so one of the problems of operation is solved right at the start.

Fortunately we don't need to worry about the many complicated formulas which the engineer has used to figure out the methods of putting hydraulics to work for the farmer. The important thing is that today it is possible to farm on a tractor that has controls for raising and lowering the implements with finger-tip effort, and for steering with power supplied by a hydraulic cylinder that will smooth out the roughest field. Even the tractor seat may be hydraulically cushioned. And at least one tractor already is equipped with a hydraulic, torque-convertor transmission. With the coming of hydraulic transmissions we have just about every important function on the tractor under hydraulic power and control.

The Heart of the System

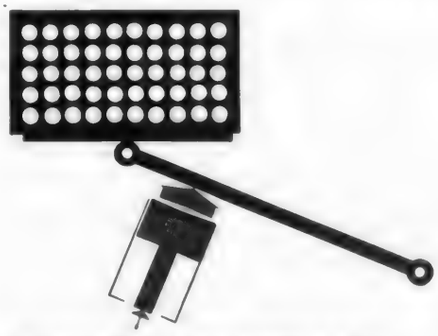
A good stout man can develop about 1/20th of a horsepower. The pump that keeps him going is his heart. A hydraulic system's heart is a pump, too, and it is just as important to a modern tractor. The big difference is that the hydraulic pump can control 20, 40, 60, or just about any amount of horsepower that is needed for the job at hand.

Pumps for hydraulic systems are divided between: (1) piston pumps; (2) gear pumps; and (3) vane pumps. There are some variations, of course, within each type. Hydraulic pumps usually work in a range of 1000 to 2000 pounds per square inch (PSI) and have a relief valve that allows oil to escape if the pressure goes higher.

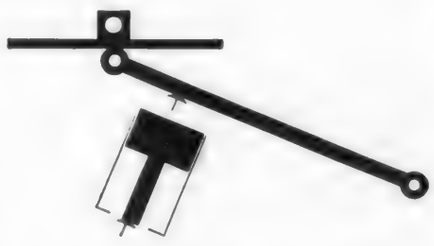
The pump may be inside the gear housing of the tractor or outside and connected to a power source like the fly wheel, cam shaft, or fan drive belt. There are also hydraulic power packs, providing a complete pump and hydraulic power system that goes on the tractor power take-off at the rear of the tractor. Any of these pumps can provide hydraulic power to operate hydraulic cylinders on or off the tractor. Pumps mounted inside the tractor proper are sitting in their own hydraulic oil bath and are well protected from damage and dirt, as well as being out of sight and sound range. Being inside the gear case they may take their power directly from a transmission countershaft or power take-off shaft.

The controls for hydraulic pumps may be both manual and automatic. On older model tractors it was necessary to turn the power take-off shaft to cause the hydraulic pump to operate. This had disadvantages when using implements pulled behind the tractors, such as balers, that required power at all times and at certain points in their operation cycle could not take forward motion. The nuisance of shifting the tractor into neutral so the

THESE DIAGRAMS SHOW HOW HYDRAULIC PRESSURE MULTIPLIES FORCE



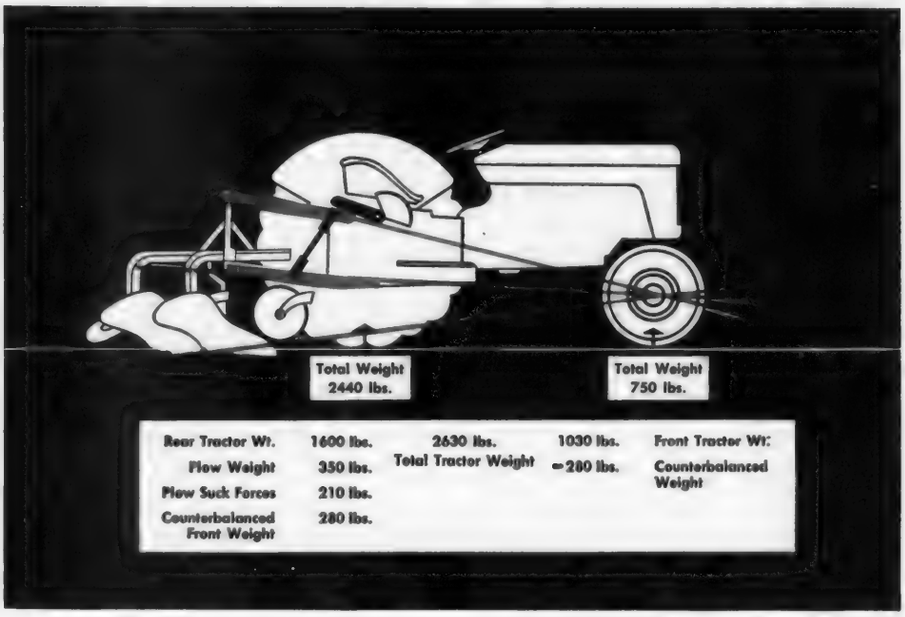
When you apply a definite amount of force to a liquid column here is what happens. Let the small arrow above represent 1 lb. of force. We apply it to a plunger of 1 square inch. The liquid column will apply the same pressure to each square inch of the plunger at the large end. If the plunger at the large end has an area of 50 square inches we will lift a weight of 50 lbs.



Now let's see what happens when we apply the same force to a metal, wooden or any kind of solid column. Again let the small arrow represent 1 lb. of force applied to 1 square inch at the small end. With a solid column we will produce the same pressure at the large end regardless of the number of units of area. If our area again is 50 inches we will lift only 1 pound.

And here we have Tom Eastman loading grass silage in the middle of the winter, an unknowing user of Pascal's Law and the Law of the Hydraulic Press. All he knows is that it is a lot easier to feed cattle silage with his hydraulic loader than it ever was in the old days.

Here a remote cylinder puts the wheels down and lifts the disk up for fast transport with no damage to lanes and roads.



This is how the 3-point hitch gets plow penetration without extra tractor weight. The implement is actually pulled into the soil by the tractor's forward motion. Once there the forces are distributed as shown in the drawing (above) to put more force on the ground than the total weight of the tractor. The heavy link in orange near the top of the plow takes compression forces in plowing, while the heavy link in orange below it takes tension, since it is doing the pulling and carrying.

The 3-point hitch above is used to raise and lower the post hole digger. Below, a self-sealing coupling is pulled off the tractor connection, with no leakage.

power take-off shaft could be turned without moving the tractor was soon overcome with "live" power take-off. This provides a separate clutching action for the tractor motion and the power take-off. One can be run independently of the other. For present day heavy-duty implements, such as industrial type loaders, an auxiliary pump, usually of the gear or vane type, is mounted on the front end of the tractor, to give added hydraulic power.

The modern hydraulic pump and control mechanism can provide these highly sensitive and accurate controls over the plows and culvating tools: lift for transport, controlled lowering for use; draft control, manual selection of the right depth for an implement as well as automatic draft control after proper depth has been selected. The automatic response of the tractor hydraulic mechanism to heavier soil or uneven land makes instantaneous correcting adjustments, as often as three times a second, to maintain constant draft. There may be a built-in pressure release; when the plow strikes an obstruction the down pressure is released on tractor rear wheels. This allows them to spin until the operator stops the tractor.

The first part of the tractor to feel the magic of hydraulic power and sensitivity was the hitch for the attachment of plowing and cultivating tools. The conception of making a plow a part of the tractor came from an Englishman, Harry Ferguson. He teamed up with Henry Ford and, in 1939, the first of the Ford-Ferguson tractors using a 3-point hydraulic hitch were introduced to the American market. This hyphenated name has since been split and each company has gone its own way but the system of using the suction, weight, and pull of the plow to pull the tires down onto the soil for a more solid footing and therefore better traction has become generally used and accepted by farmers. The advantages of the system were many, and certainly one of the most important was the reduction in the weight of the tractor. No longer was it necessary to hold down the rear wheels by the sheer weight of the tractor rear-end to get traction, as was the case of the tractor with drawbar attached implements. Besides this constant draft control there are these other basic types: constant depth control and draft and depth control.

Since that time, tractor engineers have developed an amazing list of refinements for the tractor hitch and its control system. The hydraulically-operated rockshaft which is position-responsive is widely used on the modern tractors. This plus multiple remote cylinders on drawn implements gives great versatility. In the new tractors hitching up can be done in less than a minute. Throw the lift lever, the tool rises into transport position, and you are on your way to the field.

If the pump is the heart of the tractor hydraulic system then certainly the valves are the brain of the system. The valves that control the hydraulic mechanism of a tractor may be one of several types: rotary, ball, poppet, or spool. The spool valve has become generally used and it is a versatile control, particularly for external hydraulic cylinders. Internal control valves for built-in pumps are usually of a sleeve type. They control the output of oil from the pump to the various actuating mechanisms of the tractor. On one tractor—Massey-Harris-Ferguson—the valve also controls the intake or suction side of the pump

which results in providing varying increments of implement lift.

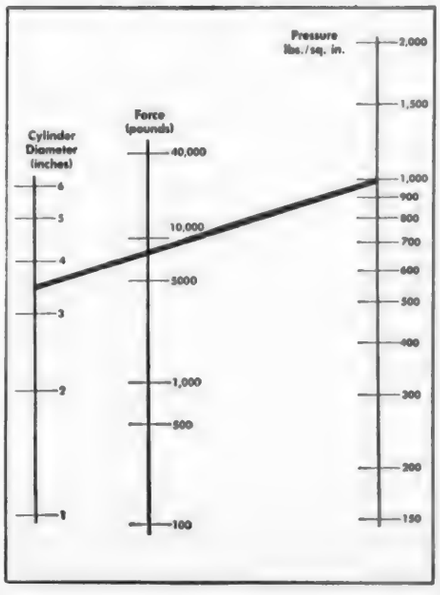
The reservoir or storage chamber for the hydraulic oil of the system will be internal, of course, on a built-in system. It must be large enough to radiate the heat generated and also take care of the expansion of the fluid. In designing the reservoir there is a provision for baffles to prevent oil from foaming.

A filter is often incorporated in the hydraulic system. In any case, cleanliness is next to godliness in the hydraulic system. The clearances of hydraulic components are usually much closer than any other part of the tractor and the presence of dust and dirt should be prevented if possible, or eliminated if it does get inside. There is no better advice than to follow the manufacturer's recommendations on type of oil (mineral oils of special grades and properties are usually recommended), on filter changes and oil changes.

Of course, there is built-in protection for the Dilberts who don't pay any attention to instructions. Ford engineers recently tested their new piston pump under desert conditions by introducing 16 grams of dust into the hydraulic system. The system was run for 25 hours, then dismantled to check the results. The pump was not damaged, apparently, but only an engineer would want to try this one.

The hydraulic cylinders used externally on implements are now fairly well standardized. They have honed and polished barrels and extremely close clearances. They are not at all expensive considering the work they can do. Where else can you get an extra arm for $25 that will lift 5 tons for the rest of your life? There are numerous supply houses that specialize in all kinds of hydraulic cylinders, valves, and fittings, where the do-it-yourself farm mechanic can buy hydraulic jacks for lifting sagging floors or cylinders to move doors or lift wagon beds. Hydraulic motors which convert high pressure hydraulic fluid into rotary shaft horsepower are becoming available. One chain saw is operated in this manner, using hydraulic pressure to spin the saw.

In all external, off-the-tractor hydraulic uses, the first thing needed is hydraulic hose and couplings. These are available in self-sealing connections. When you pull a coupling apart by hand each end seals itself quickly and completely. No wrenches are needed and there is no oil leakage. In fact, little pressure is lost.



Here's how a 3½-inch hydraulic cylinder multiplies force. The area of a 3½-inch diameter cylinder is approximately 9¾ square inches. If we apply a force of 1,000 pounds per square inch on our hydraulic oil this is multiplied by 9.75 and becomes 9,750 pounds of pressure at the working end of our cylinder. You can use this diagram to figure other rough hydraulic problems.

Many of the new tractors are equipped with hydraulic hoses connected directly into the tractor's hydraulic system. This makes remote hydraulic cylinders easily attached. Here is a removable cylinder being attached to a disk. This cylinder is carried on the back of the tractor and may be used on a number of implements.

Where Hydraulics are Used

There are so many applications for hydraulic power outside the tractor itself that it might be easier to point out what implements do not have hydraulic aid. Here are, however, some of the most important uses:

Combines. Modern self-propelled models may have hydraulic table lift, speed control pulley and reel adjustments. Power packs often serve as the power source.

(*Continued on page* 78)

Grasses for the Soil Bank

AMERICAN FARMERS have been asked to put 20,000,000 acres into the conservation reserve of the national soil bank in 1957. Twenty million acres is a piece of land just a little larger than the entire state of South Carolina; actually, it is a total of 31,250 square miles and the total area of South Carolina—land and water—is only 31,055 square miles.

As the bare statistics indicate, throwing such an amount of land into the soil bank is a formidable job. But the most unique thing about it is that while some of this land will be planted to tree crops, much the larger part of it will go into grasses and legumes subject to conditions almost unprecedented in the history of farming. Except under emergency conditions designated by the Secretary of Agriculture, none of these acres can be grazed or cut for hay or silage.

This land will be contracted to the government for a minimum of 3 years, in some cases for as long as 10 years, or if trees are planted, for an even longer term. If a cover must be provided for the land the government will pay up to 80 per cent of the cost of establishing grass and legume stands but in such cases the minimum contract will be for 5 years.

So the American farmer is faced with a brand new question: What do you sow on acres from which you can expect no harvest?

Obviously such points as the nutritional value of the crop, its palatability and its value for pasture, hay or silage carry little of their usual weight in selecting a grass or legume under these conditions. The things a farmer needs to know in making his selection are whether or not the plant will grow in his area, how permanent it will be, the availability of the seed, a few points on the establishment and maintenance of the stand and whether the species might become a pest. Some farmers, for example, will have nothing to do with sweet clover because it gets into their hay fields and gives them trouble in curing fine quality hay. And while Johnson grass is even on the recommended list in some states, there are thousands of bottom land acres in the Midwest where it regularly takes over the corn crop. Except for these two and possibly Bermuda grass in some areas of the South there is little danger of any of the forages recommended in the appended list developing into pests.

Until farmers have acquired a few years of experience in soil banking the best advice that can be given is to select grasses and legumes with a view to adaptability as indicated by the map on page 57 and the list of adapted forages. This list has been prepared from the recommendations of state ASC Committees and commercial seed distributors. While it indicates in general where the various species of grasses and legumes are adapted this does not mean that these species will grow everywhere in these regions. It shows, for example, that 8 different legumes are adapted to the Southern Great Plains, yet the only areas in Texas in which any legumes are recommended (hop, white, crimson or Persian clover and Hubam or Madrid sweetclover) are in the eastern timber country, the Gulf Coast prairie, and the blacklands and Grand Prairie. Be sure to consult local advisors before attempting to sow any species uncommon to your area. As of the fall of 1956, seeds of the forage crops listed are in adequate supply except as indicated in the table.

(*Continued on page* 129)

1. *Northern Humid Area*
2. *Central Humid Area*
3. *Southern Humid Area*
4. *Eastern Coastal Area*
5. *Northern Great Plains Area*
6. *Southern Great Plains Area*
7. *Northwest Intermountain Area*
8. *Southwest Area*
9. *Northwest Coastal Area*
10. *California Coastal Area*

Here are the Legumes and Grasses Adapted to Your Area

	Regions of Adaptation									
	1	2	3	4	5	6	7	8	9	10
Alfalfa	x	x	x	x	x	x	x	x	x	x
Birdsfoot Trefoil	x	x					x	x	x	
Red Clover	x	x	x		x	x	x	x	x	x
Sweet Clover	x	x	x		x	x	x	x	x	x
Ladino Clover	x	x	x	x	x	x	x	x	x	x
Alsike Clover	x	x			x		x		x	
White Clover	x	x	x	x	x	x	x	x	x	x
Lespedeza	s	x	x	x						
Vetches	x	x	x	x	x	x	x	x	x	
Kudzu		x	x	x						
Crimson Clover		x	x	x						x
Rose Clover		x	x	x						x
Button Clover		x	x							x
Sour Clover*			w			x		x		x
Bur Clover			x	x		x		x		x
Subterranean Clover			x	x					x	x
Velvet Bean**			x	x						
Hairy Indigo*			x	x						
Berseem*								x		x
Hop Clover			x							
Persian Clover			x							
Lupine			x							
Timothy	x	x			x		x		x	
Orchardgrass	x	x	x	x			x	x	x	x
Smooth Bromegrass	x	n			x	n	x	x		x
Mountain Bromegrass*							x			
Tall Fescue	x	x	x	x			x	x	x	x
Meadow Fescue	x	x					x		x	
Redtop	x	x	x						x	
Reed Canary Grass*	x	x							x	x
Kentucky Bluegrass	x	x							x	
Tall Oatgrass*	x	x					x	x	x	
Perennial Ryegrass	x	x	x	x				x	x	x
Common Ryegrass	x	x	x	x				x	x	x

	Regions of Adaptation									
	1	2	3	4	5	6	7	8	9	10
Meadow Foxtail*	x						x		x	
Big Bluestem**	x				x	x		x		
Little Bluestem**	x				x	x				
Yellow Bluestem**						x				
Millets	x				x	x				
Sudan Grass	x	x	x	x	x	x	x			x
Bermuda Grass		x	x	x				x		x
Dallis Grass*			x	x				x		x
Carpet Grass*			x	x						
Bahia Grass**			x	x						
Rescue Grass*			x			x		x		x
Crested Wheatgrass*					x		x	x		
Tall Wheatgrass*					x		x	x		x
Intermediate Wheatgrass*					x	n	x	x		
Western Wheatgrass*					x	n	x	x		
Slender Wheatgrass*					x		x	x		
Pubescent Wheatgrass**					x	n	x	x		
Side Oats Grama**					x	x				
Blue Grama*						x				
Buffalo Grass**					x	x				
Canada Wild Ryegrass**					x		x			
Russian Wild Ryegrass**							x			
Weeping Lovegrass*					x	x		x		
Sand Lovegrass**					x	x		x		
Sand Dropseed**					x	x				
Green Needle Grass**					x		x			
Indian Grass**					x	x				
Rhodes Grass						x		x		x
Blue Panicum						x				
Harding Grass*								x		x
Creeping Red Fescue									x	
Chewings Fescue									x	
Smilo*										x
Veldt Grass*										x
Soft Chess*										x
Pangola				x						

* *Some seed available but supply not adequate.*
** *Seed supply very limited and not generally obtainable in most areas.*
s *Southern part only.*
n *Northern part only.*
w *Western part only.*

Winter Tune-up for TRACTORS

Here are maintenance tips which can save up to $170 per tractor in rounding up stray horsepower lost during the summer working season

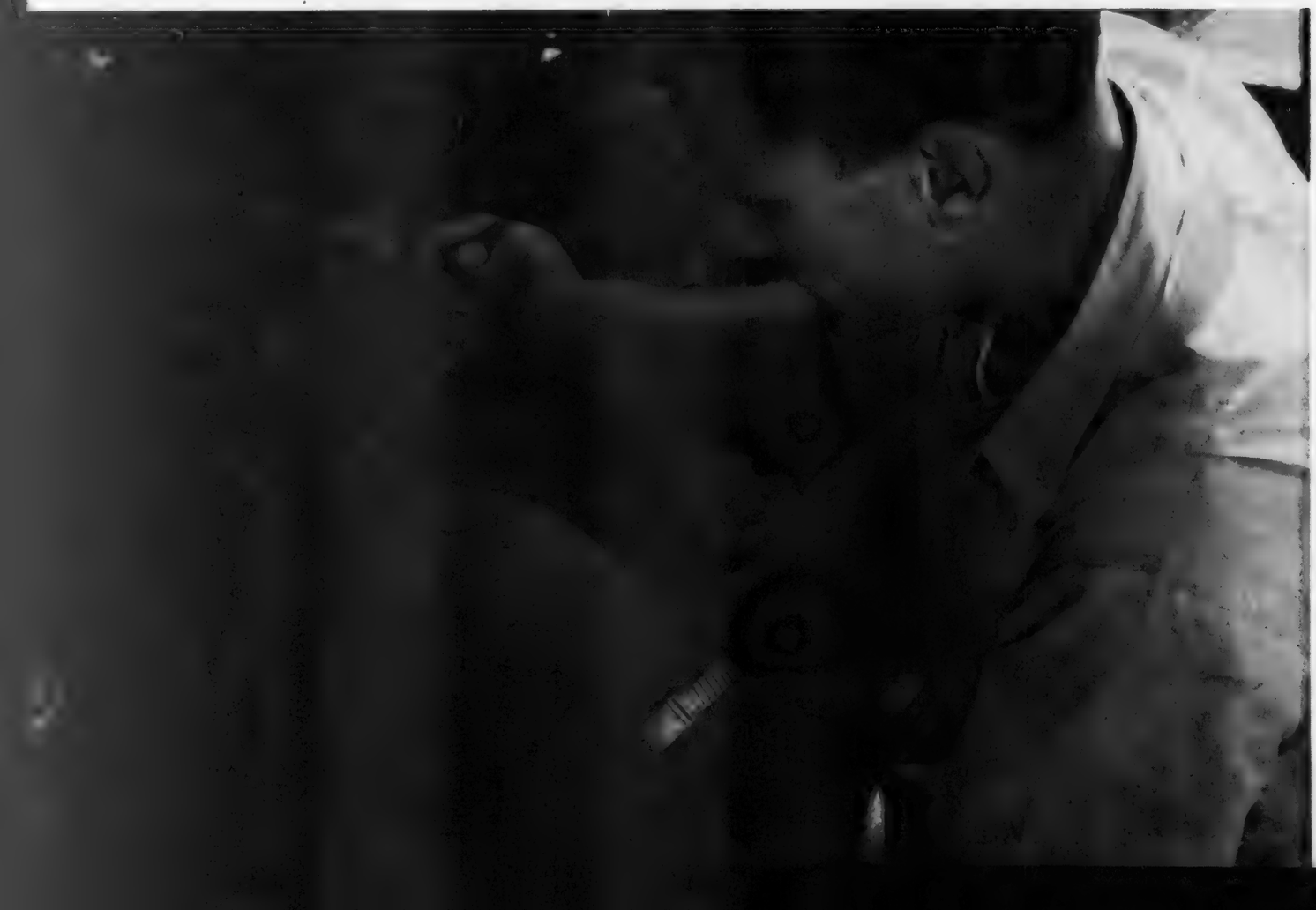
WHEN A FARMER buys a tractor, he knows its horsepower and fuel consumption. That's what he pays for and that's what he gets. A season of hard use on the farm, however, will change things; some tractors will have lost as much as 20 per cent of their power while others that have been worked just as hard will still be putting out close to their rated horsepower. Why this difference? And, more important, how do some farmers manage to hold on to the horsepower they paid for?

"If someone had tried to convince me a few years ago that I could make ten dollars a page by reading a book, I'd have told him to stop chewing that loco weed," remarked a Nebraska farmer who is one of those who keeps his tractors in top shape. "Yet, now I am a convert. And just to point up the lesson I've learned, the book comes free—it's called the *Operating Manual,* and they throw one in with each tractor you buy. Now when I talk to people about the value of really studying the manual, they either think I'm the one who's a little teched or else that I'm a man with a very firm grasp of the obvious. The thing that really converted me—and it's convinced a lot of others around here—was taking part in a five-year series of tractor maintenance tests that the University ran."

Tractor testing at the University of Nebraska has been going on for some 36 years, having been established by the Legislature at the request of farmers and manufacturers back in 1920 to impartially collect facts about the machines that are sold. In 1950, a new series of tractor tests were started which were designed to find out what was happening to tractors on the farm and to check the value of tractor maintenance and tune-up. For five seasons, these tests were made in addition to the new tractor tests which are the main job of the testing station.

Years of testing each tractor model that was sold in Nebraska had shown what these machines could do when new—what horsepower they would deliver from their power take-off, what power they could exert on a pull, their fuel and oil consumption, and other operating characteristics. But what happened to this power potential—for which farmers were paying around $70 a horsepower—after the tractor put in a year's work on the farm under farm operating and maintenance conditions? C. W. Smith, who had worked with the Nebraska tractor tests for most of his professional life, decided to answer this question before he retired from his position as Professor of Agricultural Engineering at the University.

As guinea pigs for his tests, Professor Smith lined up 23 farmers in Lancaster County who agreed to keep records on their



tractors and to bring them in once a year for testing and tune-up. Four makes of tractors, the Ford 8N, John Deere A, the International Harvester's Farmall M, and the Massey-Harris 44, were represented in about equal numbers among the farmers who cooperated in the project. Each farmer who didn't already have an hour meter on his machine agreed to install one and all of them agreed to keep track of the hours the tractor was used on different jobs, the fuel consumption, the time between oil changes.

Each tractor was equipped with a metal case, fastened on the machine, which contained a printed service record designed for the particular make of tractor. This sheet acted as a reminder of servicing jobs to be done at stated intervals, such as checking the oil level every 10 hours or repacking the front wheel bearing at 300 hours. It also gave Smith and his fellow workers the information they needed in compiling the amount of work done by the tractor on various farm jobs and an idea as to the care of the equipment during the year.

In the fall, each tractor was driven into the low, white tractor-testing building beside the big oval track on which new tractors are given their limbering up exercises before the drawbar test. Before any tune-up adjustments were made on the tractor, it was first tested to find out how much horsepower it had been delivering to the farmer.

This first test and the others that followed were run on one of the University's big dynamometers. This instrument, as the name implies, is a big electric dynamo which can be belted to the tractor. The dynamo is swung on a pivot and connected with a set of scales so that when the tractor operates it, both its speed and the torque exerted can be measured. For some tests, the whole process is reversed and the dynamo runs the tractor; in this way the friction in the tractor engine and the compression at operating speeds can be checked. After a warm-up run on the dynamometer, the governor was by-passed by tying the throttle wide open and a test was run to get the tractor's maximum horsepower and fuel consumption. Next, the throttle was untied, the hand throttle left at wide open position, and the dynamometer load was removed; this high idle speed gave an indication of the effectiveness of the governor in controlling engine speed. Later a test was run to determine how much horsepower the tractor would develop when the governor controlled the throttle.

After this initial test, the tractor was thoroughly washed, the radiator flushed, and the air cleaner checked for dirt in the oil cup, faulty choke valve action, damaged hoses, and dust-filled intake pipe. Then the tractor was again belted to the dynamometer and retested. Smith was aware that washing the tractor was not going to increase horsepower, but he felt it might increase the farmer's pride in his equipment. They did find, however, that flushing the cooling system and giving the engine a better chance to breathe increased the operation by an average of about a third of a horsepower.

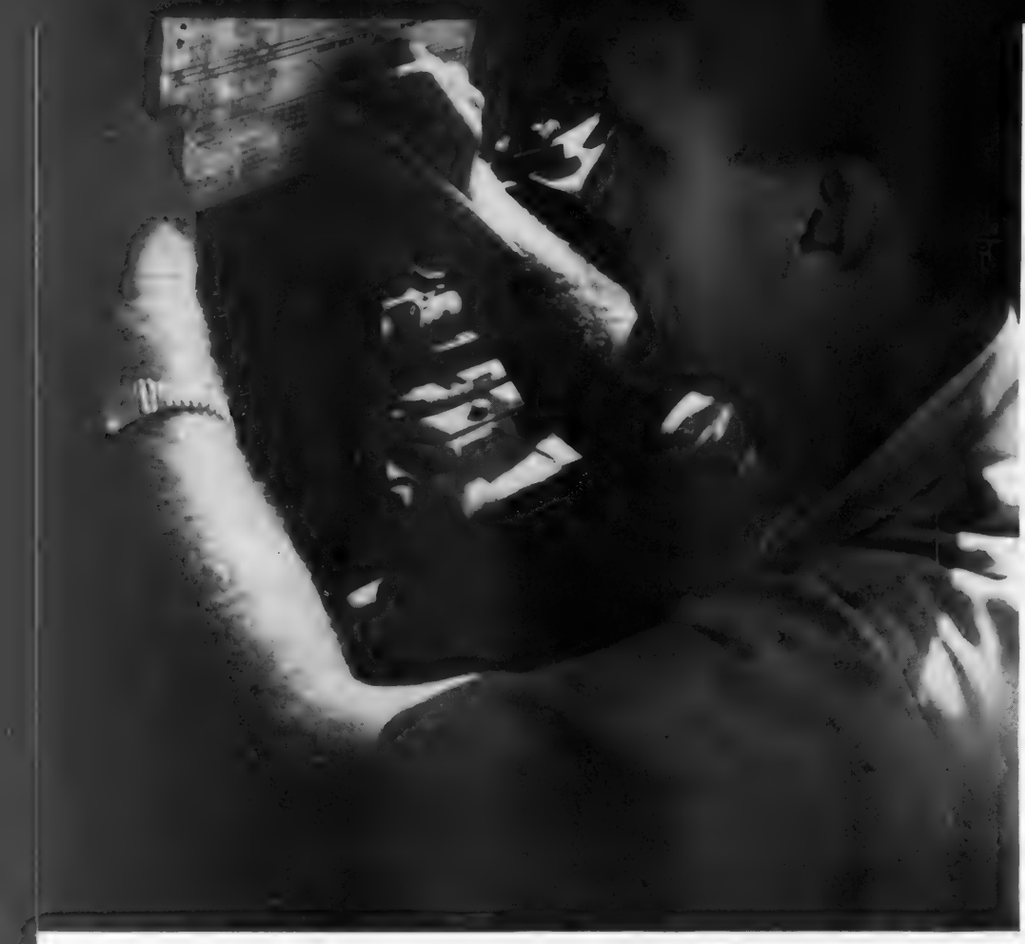
The cleaned tractors were then run by the dynamometer and the cylinder compression checked at both running and cranking speeds. Then, the valve tappet clearances were measured and adjusted; the breaker points in the magneto or distributor were checked for pitting and adjusted for clearances between points. Then again the tractor was tested to see if these operations had improved its power output.

With the engine still running the ignition timing was checked and set at its maximum power position. When this adjustment was made the horsepower rating was noted which made up yet another power test.

Still running the engine and recording its power output, the needle valve settings of the carburetor were varied to give mixtures ranging from lean to very rich. At each setting, the engine was run for six minutes and the horsepower noted as well as the weight of the fuel burned. At the end of this series of carburetor tests the engineers graphed the fuel consumption curve and the horsepower curve and selected a compromise setting between

	Ford 8N	John Deere A	Farmall M	Massey-Harris 44
Average increase from cleaning air filters and washing tractor.	.46 HP	.31	.33	.24
Average increase from adjusting timing and ignition.	.83 HP	.40	.64	.29
Average increase from cleaning combustion chamber.	1.62 HP	.79	.87	.86

The average horsepower regained by each tune-up operation is shown in the chart (right). The mechanically apt farmer (left) can do the work himself if he follows the operations manual.



A tractor must breathe freely if it is to put out maximum power; dust in the air intake and filter (right) is the most easily corrected power loss. Two important tools in tractor maintenance (above) are the hour meter and an operation chart which shows when each job should be done and when it *was* done.

maximum horsepower and minimum fuel consumption. The important point in this and the ignition timing test was that in both of them the settings which were shown to be best by dynamometer test were practically identical with the recommendations of the manufacturers as shown in their operating manuals.

During the last two years of the project, the carburetor adjustment and power test ended the tune-up. Before that time, Professor Smith ended the procedure by having the cylinder head pulled and the combustion chamber cleaned. Though this was found to give a good increase in horsepower, they decided to drop it from the program because of two reasons: (1) the deposits would build up again rather quickly, often in as little as 12 hours running and (2) much of this problem was being caused by a poor quality gasoline that was flooding Nebraska at that time. When the gasoline was improved, the excessive deposits were no longer formed.

One of the most surprising findings of the research people was that though every tractor had lost power during the year of operation, none of the farmers were aware of the power loss. The loss took place so gradually that the farmer didn't notice it—a little like trying to watch the movement of the hour hand on a clock. "That first year when I drove my tractor in for tune-up and checking they found that it was turning out only twenty-two horsepower and I would have sworn that it was running like new," La Vern Rockenbach, who uses two tractors on his 320-acre farm, said. "After they had checked it over and made the adjustments, they raised the horsepower up to twenty-six, which is as high as they got out of the new model they tested at the Nebraska Station. I could really feel the difference when I drove her out."

Over the five seasons of testing during which time Smith and his co-workers made 92 complete tests, only one tractor on one year of its tests failed to produce more power after the check-up than before. With most of the machines, each step of the tune-up added some power. Washing and cleaning the air filters, as was mentioned, added an average of .33 horsepower; some tractors did not respond at all to this first step while one machine was given a boost of two horsepower by the simple process of cleaning.

Checking the tappet clearance, the sparkplugs, engine compression, and the distributor gave an average increase of .3 of a horsepower with the machine showing the greatest response jumping 3.5. Ignition timing increased power on most tractors with an average boost of .54 of a horse in the 92 tests; the biggest individual increase for this operation was 3.1 horsepower. One of the pleasing aspects of this test was that any farmer who followed his instruction book could have done his own timing job on the farm.

The biggest surprise came from the added power that was produced by proper carburetor setting. Here the average tractor picked up an additional 1.12 horsepower and the machine showing the highest increase added 4.9 horses or an increase of around 17 per cent. The most common mistake made by the farmers who cooperated on this project was that they all tended to lean down the mixture to a point where the tractor wasn't operating efficiently. In test after test with all four makes of tractors it was clearly shown that the manufacturers knew exactly what they were talking about when they made their recommendations on carburetor settings. The dynamometer tests showed that the most efficient settings were almost exactly the same as those recommended. It was also clearly shown that farmers find the carburetor a fascinating gadget to fiddle with and that they weren't following the book when they did it. When the figures were assembled, it was obvious that the farmers were not saving any fuel by their carburetor adjustments for in every single case the tuned-up tractors gave more horsepower hours per gallon of fuel than they did before the adjustments were made. This increase ran from a low of .1 on up to a high of 2.3 horsepower hours per gallon.

Scraping the deposits from the cylinder head gave an average increase of a little over one horsepower, but an improvement in the gasoline changed this picture.

The total average increase in power for the 92 tests amounted to 2.57. The greatest power increase for any single tractor was one that delivered less than 6 horsepower on its first test, 5.7 to be exact, and ended the test after adjustment turning out 29.3. This spectacular gain in power came after it was found that the governor was failing to do its job.

The function of the governor is to control the amount of fuel and air which goes to the engine within the limits of the throttle setting. When the governor control lever is set in the fully advanced position and the tractor is doing no work, the governor holds the engine to its high idling speed; when a load is added, the governor gives the engine more gas and air. If the governor fails to open the throttle valve, the tractor is starved of power.

The adjustment of the governor is a job

Moving lights make a permanent record of power in this night photograph of round-the-clock tractor testing at a manufacturer's proving station. The information gathered here is used in compiling the operator's manual. With equipment such as the shop dynamometer, below, implement dealers can run the same power tests and follow the same tune-up procedures as those worked out by the University of Nebraska to restore lost horsepower.

that the farmer can't do himself. Unfortunately, many of the dealers are not properly equipped to do it either. To do the job properly, it is almost essential to belt the tractor to a dynamometer and make a power test on the engine as the governor is worked on. As Rockenbach said, "One thing the tests made me want was a dealer who could run the same tests for me at his shop—they convinced me that a good tune-up was well worth paying for. One year—just to show you how these things go—I was having trouble and the dealer looked over the spark plugs and then suggested that maybe I ought to have a valve job. Since I was due to take the tractor in for testing shortly, I waited. With their instruments they soon found that there was a hidden crack in one of the plugs; they also found that the compression was o.k. That little incident

(*Continued on page* 82)

Don Humphrey and Norm Godden stand in front of the mixer of their Kingston, Ohio, plant. Controls for the complete operation are within easy reach.

Liquid Fertilizer Plants

By R. J. McGinnis

- ✓ **Rural plants are serving the growing demand for complete liquid fertilizer**
- ✓ **A farmer with $50,000 in cash or credit can build and operate a plant**
- ✓ **Operation requires little engineering skill. Package plants are available**
- ✓ **An efficient plant will break even on an annual sale of 500 tons**

LIQUID FERTILIZER has arrived. Its acceptance by the farmer has created a brand new on-the-farm business opportunity which did not exist ten, even five, years ago. This new business can be a profitable sideline for the big farmer who wants to take the profit on the big volume of fertilizer he uses in his own operation and has an outlet among his neighbors for excess production. Or it can be a full-time venture for the rural businessman.

The successful liquid fertilizer plants are located in prosperous farming areas—areas where farmers are in the habit of using 250 pounds and up per acre on big fields of corn and wheat, where pasture fertilization is an established custom.

Dry fertilizer has always been mixed, bagged, and shipped by large manufacturers because the operation requires a great deal of expensive machinery and engineering know-how. It has always been sold by dealers in rural centers, very often farmers, who usually combine fertilizer sales with their farming operation or with sales of machinery, feed and/or seed.

However, liquid fertilizer does not lend itself to the same methods of manufacture and distribution. Although, pound for pound, liquid fertilizer has the same plant nutrients as the dry variety, the carrier for the liquid type is water, which is expensive to ship and is a plentiful commodity which can be added at the point of mixing. Bagged or bulk dry material can be stored in a cheap building and requires no special railway car for hauling. The liquid type requires tanks for storage and hauling. Therefore, on-the-farm, or near-the-farm, mixing was indicated at the very outset of the business. The potential of the industry is a mixing plant in every farming community, serving farms within a radius of 25 to 50 miles, operated by farmers, or rural businessmen.

As liquid fertilizer enters the field in competition with dry materials there is a good deal of pulling and hauling, double-talk and confusion in the industry. Because of less labor and cost in application, speed of application, and ability to apply at all seasons and under all conditions, the steady growth in the use of liquids is inevitable. The fertilizer manufacturers see this, and they also see that any move to supply the raw materials to the liquid mixing plants would, in a sense, be entering into competition with themselves. Manufacturers of the equipment for liquid-mixing plants groped around in the dark, for there was no pilot plant for them to follow, and no clue to what the industry would eventually settle for in the form of costs, size, or design. The engineering, design, capacity, and much equipment had to start from scratch.

The impetus was finally to come from farmers themselves. Bold pioneers assembled what equipment they thought might do the work, set it up, and by trial and error brought the design and plans to a point where a fairly workable standard has been set. There is still a great deal of confusion, and a great need for standardization. But one may safely venture into the business today with the assurance that he can make and sell liquid fertilizer at a reasonable profit for himself.

The experience of two young farmers, Don Humphrey and Norman Godden, of Kingston, Ohio, is a good example of the problems recently faced by the liquid makers. These two young men have set a sort of pioneering record in assembling equipment, selling, educating the farmer, and in general organizing a liquid fertilizer business which may well set the pattern for anyone anywhere who is interested in launching such a business.

Humphrey and Godden Launch Flo-lizer

Step by step, this is the way Humphrey and Godden planned their plant and launched their business.

Both college graduates, when they got out of the service they went back to family farms. They were neighbors and newly married and found a lot in common in figuring how to make a living under declining farm prices. One of the high-cost items they discussed was fertilizer. Their two farms use an average of 170 tons a year, and the profits from that tonnage, they figured, would look pretty good in their own pockets. They knew they could count on several times that tonnage among their neighbors. They had both been using various forms of liquid nitrogen and it wasn't but a short jump in thinking to a complete liquid.

ASCO LIQUID FERTILIZER
PRICE LIST
Effective August 1, 1956

Grade	Per ton
10-10-10	$63.00
8- 8- 8	50.85
5-10-10	51.50
4-12-12	49.80
10- 5-10	56.10
10- 0-10	42.80
14- 7- 7	66.15
15- 5- 5	67.60
6-18- 6	62.80
8-24- 0	71.85

NITROGEN SOLUTION
32% Uran—12c per lb N F.O.B.

DRY MATERIAL
0-0-60—$53.00 per ton, applied
300 lb per acre or more
or $47.00 per ton, loaded on your truck at plant

All prices are cash and subject to change without notice

NO BAGS TO BUY
NO BAGS TO LIFT
NO BAGS TO BURN
NO BACKS TO BREAK

Agricultural Supply
INCORPORATED
Thorntown, Indiana Phone 46

A typical price list for popular liquid formulas at the Thorntown, Ind., plant. These are competitive for dry stuff in this area.

This home-made tractor-mounted rig carries enough liquid for 6 acres of corn. Similar rigs can be bought for $35 to $80.

The Kingston, Ohio, Flo-lizer plant owned and operated by Don Humphrey and Norm Godden. Left to right (1) Combined delivery truck and spreader. (2) The mixing plant, with convertor in foreground. (3) Well. (4) Phosphoric acid tank. (5) Two nitrogen solutions tanks. (6) Three storage tanks for complete solutions ready for delivery.

"If we could supply our own fertilizer at cost," Humphrey says, "and sell excess production to some of our neighbors, we believed we could justify putting up a plant.

"We first made a survey of the potential market in our area. Kingston is roughly in the center of four counties in one of the best corn and wheat areas of Ohio. We drew a circle with a radius of 35 miles around Kingston (the area we figured we could service from a Kingston plant) and asked the USDA how much dry fertilizer was used in this area. The report was 70,000 tons. If we could sell only a small part of this tonnage we knew we would be in business."

As a sort of trial balloon, they took a dealership for liquid nitrogen solutions. The nitrogen manufacturer put up a 22,000-gallon tank along a siding in Kingston and a number of applicators and a tank truck were rented. They sold the nitrogen, hauled it to the customers' farms, and applied it. The enthusiastic reception of liquid nitrogen convinced them that they could do equally well with a complete liquid fertilizer. They decided to go ahead with a plant. They adopted the name "Flo-lizer" for their product and had the name copyrighted.

The two men spent the fall and winter of 1955 visiting liquid mixing plants in Indiana and points west. The outlook was not encouraging. Some of the plants reported good business, good profits, and a bright future; some were losing money. Few of the plants seemed to be well planned and there was no firm agreement on equipment. They found a wide range in the estimates of the amount of money required to put up a plant. These estimates ranged from $35,000 to $75,000. The amount of operating capital was another item hard to pin down. One plant operator told them, "You'll need plenty of capital, maybe $50-75,000. Farmers around here don't pay for their fertilizer until their crops are in, and some not then. A carload of potash costs a lot of money and if you want to discount your bills, you've got to have cash or credit."

But they stuck to their guns, accumulated information on the various components of a mixing plant, and shopped around for bargains and the most economical way of building and assembling a workable plant.

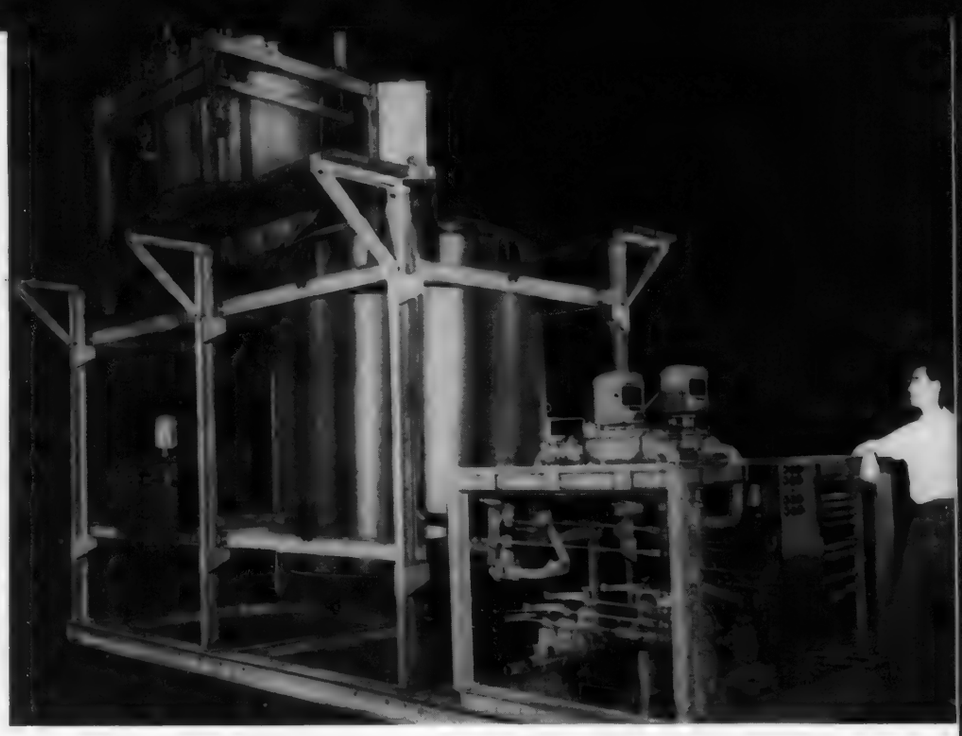
As a site for their plant, they bought an acre of land on a siding of the N&W on the south edge of Kingston. They paid $1,000 for the land which they felt was high for an acre in that community. However, it happened to be near enough so that their liquid-nitrogen storage tank could be tapped by a pipeline and the plant could be reached from a side street by building a little over 100 yards of driveway. The location of a liquid fertilizer plant on a railroad siding is preferable, but not necessary. With the exception of potash, which is shipped loose in cars from New Mexico, the other ingredients of liquid fertilizer, phosphoric acid and various forms of nitrogen, can be brought in by truck cheaper than by rail. The road and an apron for loading was graded and covered with a pea gravel surface for the reasonable figure of $800.

The site was now ready for the building. On the design and construction of their building, Don Humphrey says, "We had a suitcase full of drawings but only a vague idea of what we wanted. However, in our travels we became interested in a plant engineered by J. C. Carlile, of Denver, who had put up a few plants on commission and we went into a huddle with him. The result was our present building, which we think is near perfect for our operation."

The building is made of dressed grooved pine with a sheet steel roof. It is 30x40 feet with a 10x10-foot lean-to room for the mixing pit. It is lined with dressed pine in the storage portion. Reinforced concrete blocks footed in concrete extend up to 4 feet of the walls. A twenty-foot loading dock is flush with car floor level. Storage will accommodate 100 tons of potash and 50 tons of dry nitrogen material. There is no deterioration in storage, although urea does cake a little.

All the machinery in the plant is in the small mixing room with the exception of the scales, which are the floor platform type, located near the mixing tank for quick weighing and dumping.

The core of the mixing room layout is the mixing tank, a 1000-gallon mild steel tank with a cover. Set into the cover at an angle is a mixer, an electric motor with two impellers. Also mounted on the cover is a scrubber, one of the key pieces of equipment. The scrubber is said to simplify the mixing operation by eliminating the ammonia fumes and preventing loss of water or ammonia. Briefly, it pulls the free ammonia fumes and steam into its core and sprays a stream of water through the gases to absorb both the ammonia and water and return them to the solution without loss. When the phosphoric acid and the alkaline aqueous ammonia come in contact, a high heat is generated. If the released ammonia and water vapor were not captured and returned to the batch, it would be thrown out of balance and more of each would



A package plant made by the Standard Steel Mfg. Co., of Indianapolis, and selling for about $12,000. Top is the weighing hopper, then the mixing tank, and in front are the meters, gauges, valves and the control panel.

have to be added to keep the correct proportions. Without the scrubber, this would have to be more or less a guessing contest and time would be lost in testing. In place of a scrubber some plants have rigged up a hood with a fan, similar to the familiar arrangement over kitchen stoves, to draw off the fumes. Humphrey and Godden regard the cost of the scrubber as money well spent. Designed by J. C. Carlile it is presently the only ammonia-phosphate scrubber on the market.

The heart of the mixer is a handy gadget, a pH meter, which takes the guesswork out of mixing and permits the use of a mild steel tank in place of the stainless steel tank or rubber-lined tank, used in most layouts. The pH meter indicates the correctness of the mixture and keeps it neutral at all times. Should the mixture go acid for only a few moments, corrosion would immediately set in. If any one of the meters which measure ingredients should go haywire and an acid mixture result, application machinery—corn planters, spreaders, etc.—would corrode in a very short time. Mixing can be done without the pH meter, but it is dangerous and necessitates frequent and time-consuming acid tests on all solutions before they are sold. The mild steel tank costs $600, while the same size in stainless steel would cost nearly $1500. This is one of the many savings effected by the pH meter.

Here's How It is Made

As the operator stands in front of the mixing layout, he has easily at hand the various valves, meters, and pump controls and can see at a glance what is going on. To mix a batch he simply turns on, in

(*Continued on page* 111)

A Hough payloader is dumping urea into the hopper, which empties into the mixing tank. Beyond the payloader are the scales.

Horse-Radish King

Ellis Huntsinger grows and processes more than a third of the nation's horseradish; it requires special soil, climate, machinery

A SPOONFUL OF CREAM, dropped casually into a jar of old-fashioned horseradish, made a rich man of Ellis Huntsinger and expanded a kitchen table industry into a national organization that sells more than a million dollars worth of the root each year.

Huntsinger and his two partners, his son, Gene, and his son-in-law, Ed Bartusch, have more than 500 acres planted to horseradish on their five farms near Eau Claire, Wisconsin. The enormous tonnage of roots from this acreage is all processed and bottled in a plant on Huntsinger's home farm and shipped to every corner of the country. One out of every three bottles of horseradish on American tables is grown on the Silver Springs Gardens farms.

Ellis Huntsinger, a blue-eyed, stocky man with a deliberate, quiet way about him, was born on his father's truck farm near Eau Claire. When he was graduated from high school in 1910, he got a job as a salesman and made a good living at that until the depression hit in 1929. He lost his job and returned to Eau Claire with his wife and two children.

"The old home farm was vacant," he says, "and I thought I could put out some vegetables, tomatoes and sweet corn and the like, and sell enough to keep my family in groceries.

"I remembered that when I was a kid my family always had a hard time wintering themselves. There was no income in winter and by spring all the money was gone and my father had to borrow from the bank to get a crop started. A crop that would bring in some money during the winter would be a great thing for us.

"I thought of horseradish."

Huntsinger planted a half acre and that fall dug up a ton of roots. He cleaned out an abandoned chicken house, bought a small hand grinder and a few dozen labels and bottles, and went into business.

"At first," he says, "the fumes drove me out of the shed every five minutes. Then I rigged up some fans and got going, filling the bottles with a spoon and licking on the labels.

"I tried to sell through the groceries, but they wanted only a half-dozen bottles or so because the stuff wouldn't keep long. I finally hired some boys to peddle the bottles from door to door. A five-ounce bottle sold for 15 cents and I gave the boy 5 cents. This worked out pretty well and that's the way I sold horseradish until we got into the business on a national scale."

After it is grated, pure horseradish soon loses its kick and turns black. Its bite comes from a highly volatile oil similar to that in mustard seed. Adding vinegar preserves its color and strength somewhat, and refrigeration will delay the weakness of age still a little more, but not enough to permit shipping for any distance. Until Ellis Huntsinger stumbled on his revolutionary recipe, horseradish distribution was purely local; it was ground and bottled locally, and peddled locally. In fact, there was very little horseradish business anywhere. If one wanted horseradish, it was dug up in the corner of the garden, grated and used fresh.

One evening at supper, Ellis Huntsinger was about to give his coffee a shot of cream and his eye fell on the horseradish jar, a permanent accessory on the Huntsinger table. He tipped about a spoonful of cream into the jar, stirred it, and tasted.

"It had a much more pleasant taste than the straight stuff," he says, "and the mixture was whiter and smoother." He placed the creamed horseradish, along with a jar of untreated, on a shelf, and forgot it for three weeks.

"When I got it out," he recalls, "the creamed horseradish was just as strong as when I had put it in; the pure stuff was flat and tasteless. I knew I had hit the jackpot."

The happy accident of the cream was a two-headed blessing. Not only did it stretch the keeping qualities of bottled horseradish from days to months, but it permitted Silver Springs to set up profitable prices. This was in the days of OPA and that agency had set the horseradish ceiling so low that Huntsinger was losing money on every bottle he sold. He persuaded OPA that his creamed horseradish was a new product and got a considerable hike on the ceiling price.

This was the beginning of a constant expansion of the Silver Springs operation. The next year he doubled his acreage and began to ship his product by car and truck. He bought four more farms until acreage went to 500, built a factory, and designed special machinery for planting and digging. The last expansion in acreage came two years ago when he purchased a 1000 acre swamp; 250 acres are now in the root. The entire 1000 acres will be ready for a crop of horseradish next year.

The 1000-acre Mondovi peat swamp was purchased from a number of farmer owners who figured they were well rid of worthless acreage. During the last two years Huntsinger has spent $110,000 in purchase, drainage and clearing. It is now worth close to half a million dollars and has the kind of soil that will raise bumper crops of horseradish.

There is one drawback. While every building on the Silver Springs layout is fireproof, the swamp is not. Huntsinger has designed ditches so that drainage water can be held back to flood out a peat fire.

How the Crop Is Grown

Horseradish is propagated from cuttings. These cuttings are taken from the main root when it is dug, cut into twelve-inch lengths and planted in shallow trenches about four inches apart. It is then hilled with discs—covered about four or five inches deep to form a ridge. The crown of leaves starts from one end of the cutting, the root from the other. At Silver Springs, planting is semi-mechanized. Four men sit on a converted two-row cabbage planter and drop the roots in the row. Approximately 10,000 are planted to the acre.

Planting comes twice a year, in the spring and fall, as does harvesting. Because of the deep root, which goes to seven feet, there was no machinery on the market stout enough for digging and Silver Springs mechanics designed and built diggers in the company shop. The diggers go down 18 inches and dump the root out on top of the ground. The roots are topped by a rotary mower, dug, loaded by hand, and hauled to storage where they are kept under a 32 degree temperature until processing.

Horseradish grows all winter. Here bags of cuttings sprout in storage at 32 degrees.

The plants are cultivated frequently and are heavily fertilized, up to two tons per acre. Anhydrous ammonia is used as a source of nitrogen. A field gets one crop of horseradish, then one crop of soybeans followed by clover, which is plowed down as green manure.

The root requires a very deep, highly organic soil. "Land that will grow 80 and 100 bushel corn is not good enough for horseradish," say Ellis Huntsinger. "The high yields come on peat soils so full of organic matter that they spring under your feet like a mattress."

Cold weather is a most important requirement. The colder it is, the more kick the root has. It will keep right on growing through the winter, whenever the temperature goes above freezing. About as far south as horseradish will grow is central Missouri, where there are a number of growers near East St. Louis. There are a few growers in New Jersey and some near Chicago. The roots grow much bigger in the south, but have less quality of texture and less strength.

There are two main varieties of horseradish, Bohemian and the common, or "regular", found in many farm gardens. Roots will weigh several pounds and a good yield is 6,000 pounds per acre. A new cross will be available next year, developed at the University of Wisconsin. In the Wisconsin greenhouses the root was induced to bloom and grow seed for the first time and it is from these seeds that the new crosses have been developed. More than 90 crosses are now in Silver Springs test plots and from these will be selected the best commercial varieties. Some have grown giant roots weighing 6 pounds and are more hardy and disease resistant than the old types.

Silver Springs has a profitable sideline in the sale of cuttings, supplying most of those planted in the St. Louis area, which uses two to three million cuttings a year. Current price is around $10 per thousand plants.

Here are the men who run the Silver Springs farm and plant: son Gene Huntsinger, in charge of farm and plant; Ed Bartusch, son-in-law, in charge of product sales and promotion; and Ellis Huntsinger, the Horseradish King.

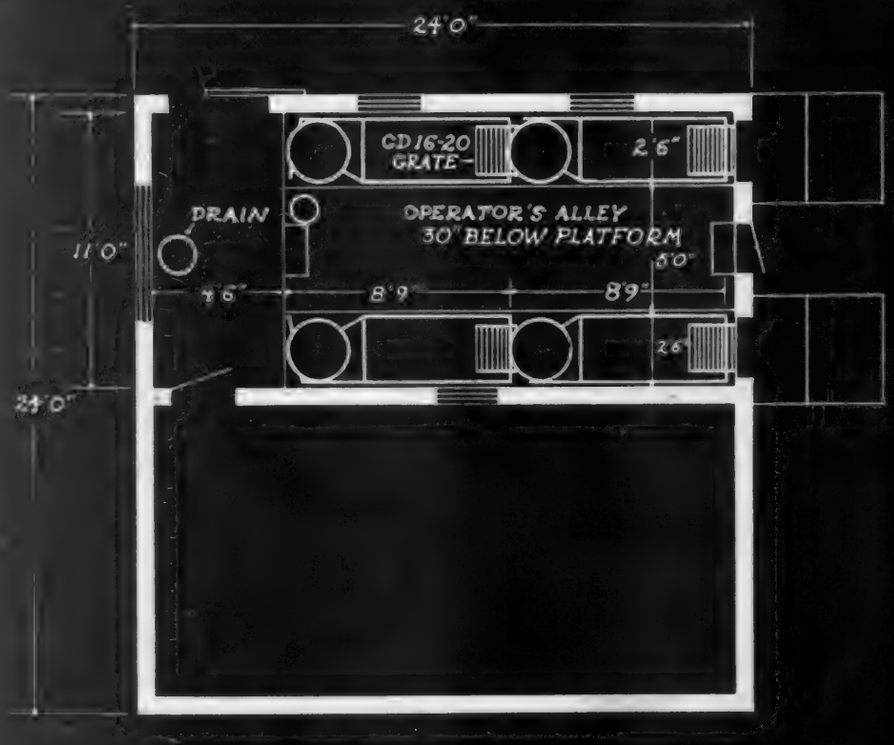
(Continued on page 84)

Tailor-Made Milking Parlors

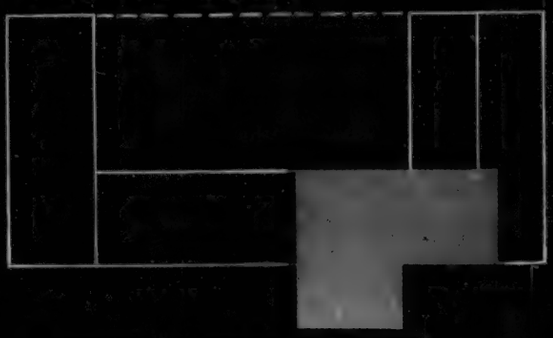
Which is the one for you—
Tandem or Lane Type?
These diagrams and pin-pointed suggestions will help you decide

The outer door of the milk room should be extra wide to permit installation of the bulk milk tank. One of the elevated milking stalls can be seen in the background.

WITH GRADE "A" milk requirements getting tougher day by day, farm labor constantly becoming scarcer and costs showing no signs of weakening, dairy farmers are adopting every practice that promises to help them produce cleaner milk with less work and at the cheapest possible cost. One of the most effective tools in this drive for sanitation and savings has been the milking parlor, an item of no small investment, but one which has never failed to pay off in cleaner milk and easier and faster milking. Proof of this latter claim lies in the long list of milk-



Color area below shows how the parlor on the opposite page is set into an aluminum sided, pole-frame loafing barn.



The lane or walk-through type of milking parlor (left) is a space saver in tight spots. Speed of operation is limited by slow milking, slow eating cows, yet users of this arrangement say this is a small price to pay for the convenience of parlor milking.

ing parlors where complete management of the herd has been taken over by the farmer's wife or teen-aged children.

This new year of 1957 will see the conversion of thousands of old milking barns to the parlor arrangement. To help with these conversions we present here some of the features which are most essential.

The Ellis Layout

Late last winter, Walter Ellis and his son, Heber, who were milking a string of registered Jerseys on their place near Harveysburg, Ohio, had the misfortune to lose their barn and their whole herd of cattle in a midnight fire. But like every dark cloud even this one had its silver lining. It put them in the position where they had no alternative but to rebuild along the most modern and efficient lines. After traveling the state to study installations on other farms and talking with extension people and equipment dealers, they settled upon the barn and milking parlor shown in plans and pictures below.

While this is a tailored installation, designed by a local dealer and adapted as perfectly as possible to the situation on the Ellis farm, it has many features that can serve as a guide to any one who intends to build a new milking parlor.

This layout was designed with a herd of 25 to 35 cows in mind. The barn is an aluminum sided, pole framed structure 40 x 90 feet. The unique feature of the arrangement is that the milking parlor, which is 30 feet by 12 feet, has been placed inside the barn. The attached milk room juts out into the barnyard. The Ellises admit they might have liked a little more loafing space for their cows in the barn, but shoving the milking parlor inside gave them the additional room they needed in their barnyard.

Parlor Details

The walls of the parlor are of concrete block, 8 x 8 x 16 in. Thirteen courses of block give a ceiling height of 8 ft. 8 in., which is generally regarded as a satisfactory minimum. Bullnose blocks were used on the corners and on the cow entrance and exit doors to eliminate sharp corners.

The floors of the milking alley and of the elevated stalls are of poured concrete. The alley floor is 4 in. thick, pitched with a slope of ¼-in. to the foot toward the stalls. The stall floor is a 5-in. reinforced slab sloped toward the rear wall with the same ¼-in. pitch as the alley floor. To provide solid footing for both the cattle and the operator the floors were finished relatively rough.

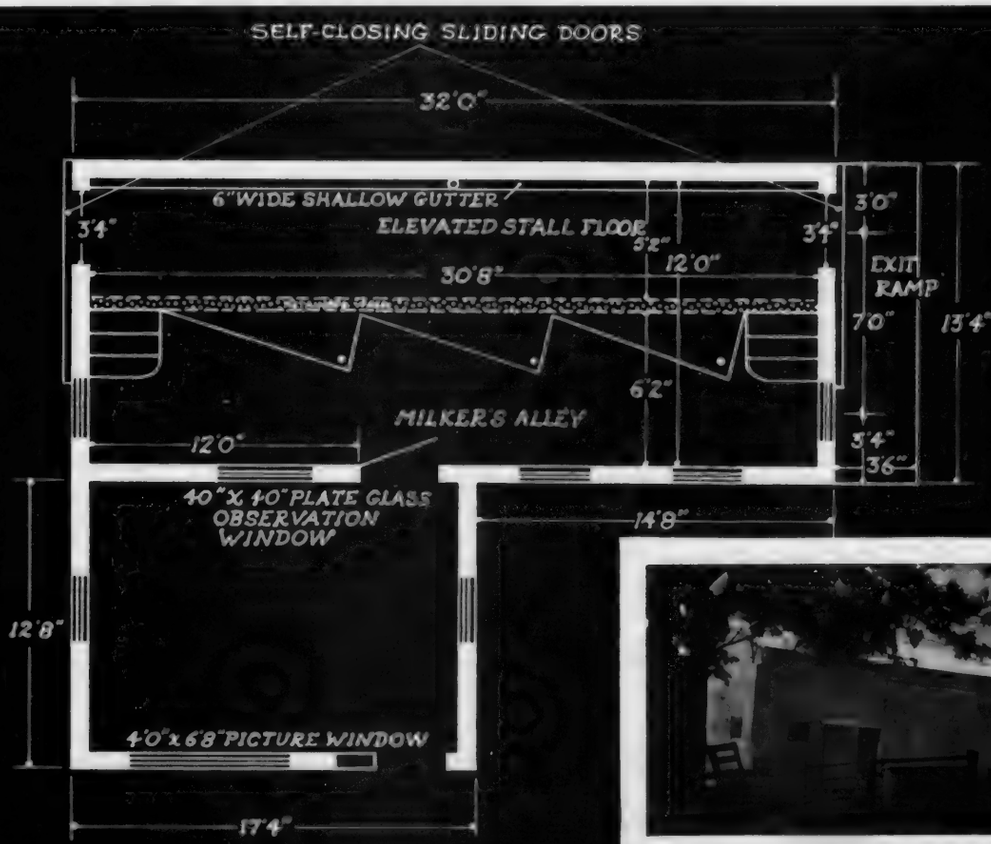
The elevated stall floor is 30 in. above the alley floor. It rests upon a retaining wall built 3 blocks high above the alley floor and the center of this retaining wall is 5 ft. 6 in. from the back wall. Supporting the stall floor at the back wall are two pillars of concrete block; these and the retaining wall rest on poured footings. The space between the retaining wall and the back wall is filled with dirt and stone and tamped level with the top of the retaining wall.

The three stalls in this parlor are set in diagonally, an arrangement which has proven very popular in most of the dairy regions. This arrangement permits ample toe room for the worker, keeps him out of the way of others working in the alley, and permits the cow to walk straight into the stall. Critics of the diagonal stall contend that it takes more room—about 2 ft. more on the width of the parlor—that it costs more to build and that the protruding corners are a bruise hazard. In practice the final choice seems to be a matter of personal preference.

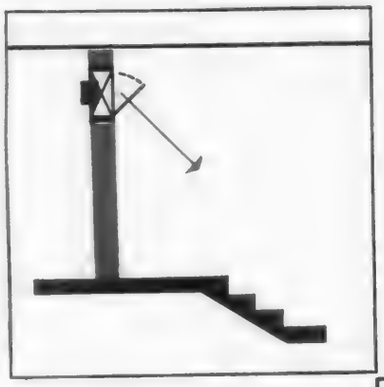
On the Ellis job, as is usually the case, the dealer who sold the equipment furnished the steel forms for the diagonal curbing and erected the stalls. This particular phase of the job is no do-it-yourself project. For a completely satisfactory installation the work should be done by a trained man.

Steps are used with this parlor to get the cows in and out. Many farmers prefer steps to ramps because there is less danger of slipping. If steps are used a 4-in. rise and 20-in. tread seem to work best. Neither the steps nor the ramp should be more than 40 inches wide so the cows will be held in single file as they come into the parlor, and railings, of course, are essential on both sides of the steps or ramp.

One feature of the Ellis arrangement which might have been improved upon is the entrance ramp. Because of space limitations it was placed so the cows walk straight into the parlor. The alternate arrangement shown in the plan on page 70 is preferable to this. In this alternate plan the ramp leads in at right angles to

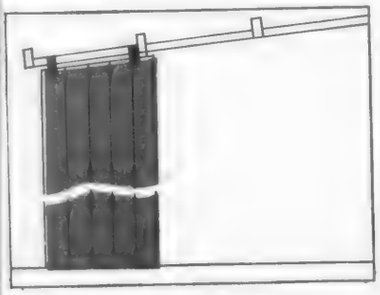


The milk room extends into the barnyard; the milking parlor is inside the barn in this new installation on the Ellis farm. Cows enter the three diagonal stalls from the door at left. After milking they leave by the opposite door.



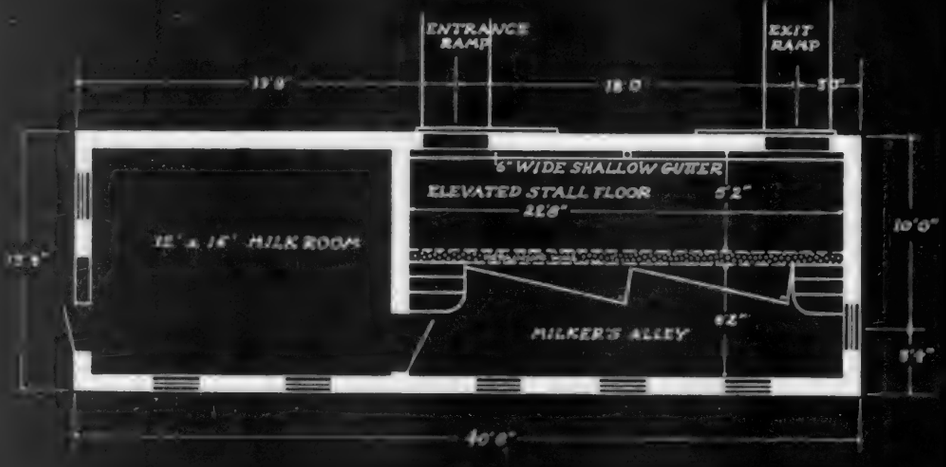
A floor light focused directly on the udder is in the nature of a luxury item but mighty helpful in detecting dirt or disease symptoms.

A 10-inch fan in the wall between parlor and milk room provides heat for the parlor. The curb (right) should be cut down at the udder working area. Entrance and exit doors for the cows should be self-closing. This can be effected either by counter-balancing or by hanging on a sloping track as shown below.



Four Helpful Ideas for Milking Parlors that May Fit Into Your Plans

This two-stall parlor is ideal for the smaller herd. Placing the entrance ramp at right angles to the line of stalls gives the operator better control over cows that try to crowd their way in before they are wanted.



the line of stalls so the cow must turn as she comes in. This gives the milker a better opportunity to shut the door and block the entrance of a following cow trying to crowd her way in.

Drains

Some milking-parlor plans call for a drain at the rear of each stall. The Ellis parlor has but two water-seal drains. The one for the milkers' alley is located beneath the overhang of the center stall. The other, which handles the drainage from the stalls, is in a shallow 6 in. wide gutter which runs along the rear wall. Those who favor this single drain to handle all the stalls point out that this eliminates any unsanitary condition which might develop from stopped-up drains near the milking equipment; furthermore, they contend it is just as easy to hose the droppings over to the gutter as it is to flush it down a drain behind the cow. A hose outlet, incidentally, is essential in any milking parlor; and in most areas Board of Health rules require that drains from the parlor must be carried outside the building before they can be tied into the rest of the drainage system.

The 40 in. x 40 in. plate glass observation window between the milk room and the parlor and the big 4 ft. x 6 ft. 8 in. picture window on the outside wall of the milk room are as functional as they are showy. They provide better light for the milking parlor and give the milker a view of the barnyard and house. The other windows are 32 in. x 42 in. four-pane steel sash placed 5 blocks above the floor with poured lintels above them.

The doors through which the cows enter and leave are 40 in. wide and 6 ft. high; they are on tracks, are counterweighed so that they are self-closing and are controlled by ropes from the milking alley. Another way to handle the doors is to mount them on sloping track so they will automatically roll shut when the operator releases the rope.

Feed Supply

The Ellis feed room is located in an older building adjacent to the new barn. Feed is ground and mixed in this spot and then augered or elevated to bins above the milking parlor from which it drops by gravity into the mangers in the front of the stalls. The exact amount of feed for each cow is controlled by a crank on the feed hopper.

The stalls themselves are a Surge installation arranged in tandem fashion. To let a cow into the stall the milker throws a lever which opens the rear gate, all the way to the rear wall, so there is nowhere

(*Continued on page* 101)

With the drudgery eliminated the girls have taken over the milking on many of the farms where the milking parlor has been installed.

"She's Sort

Steam engines get in your blood. Walter Crouse, an Iowa farmer, gives Louise, a 32-year-old Case, an annual workout to keep alive an ancient art. This medium-size wrench was part of the original tool kit

# of an Antique"

By Chester Charles

WALTER FELL IN LOVE with her some 15 years ago, when he first saw her. She had a few rust spots here and there. Her paint was scaling. She was in need of an overhaul. But in Walter's vision, every pound of iron and steel and brass in her was precious metal.

Walter Crouse is a steam engine man. He has stoked the fires and watched the gauges and handled the throttle on a dozen different steam engines around Boone, Iowa. Now his joy and his work are centered around Louise, his latest and finest engine. He named her after Mrs. Crouse and some say it is hard to determine on which he lavishes more affection.

For ten years he pleaded, cajoled and bargained with her previous owner, an old-timer from Ottumwa, Iowa. Five years ago he won out, and for $750 she was his to take apart and to polish and, best of all, to set into motion, eleven tons of meshing, chugging, reciprocating motion.

Louise had cost her first proud owner $2500, a tidy sum 32 years ago. She was built to last. Her boiler plate is heavy and her pistons of the best steel. She has size, but not massive size. She gives the impression of lean and sinewy power, a streamlining created long before the word was invented. Louise was the product of caressing hands, and since her debut more caressing hands have preserved her polished brass, her black iron and her trim of green and brick-red.

She was sort of an antique even from the day she came, spick-and-span, out of the Racine works of the J. I. Case Company. That was in 1925. When she was complete, a new era had already taken over, an era of gasoline. She ushered out an age of steam with her first whistle blast. The smaller, power-compact gasoline engine was opening up the way for the combines. The combines, their reels chomping into the standing wheat, swept across the plains, pushing the sheaf-dotted fields, the threshing dinners and the harvest goings-on into a memory.

Whenever there's a parade in Boone County, Iowa, Walter Crouse and Louise are there, too, drowning out the bands. He put rubber treads on her high steel wheels so he could drive her on the paving. "One Sunday," says Walter, "my boy took her for a joyride through town and I thought he'd get pinched, but he wasn't."

Louise is more than an engine man's hobby. Each summer she gets a workout. The past season Crouse threshed about 350 acres of oats. "This is a cattle-feeding country," he says. "Farmers like the threshed straw. Makes much softer and more absorbent bedding."

If you happen by while he's threshing, Walter will gladly show you Louise's metallic and ear-splitting charms. "I'm mighty proud to have you here while she's running," he'll say.

"I started out when I was just a kid, about 15 years old. Hauled water at first. Believe it was in 1914. I worked for an old man who owned a threshing rig. His engine man was always drunk. One day the boss said to me: 'I'm going to run that guy off. Walter, do you think you can run the engine?' I said I'd sure like to try and he told me to go ahead. He just let me alone, never bothered me and I got along just fine. I had the time of my life.

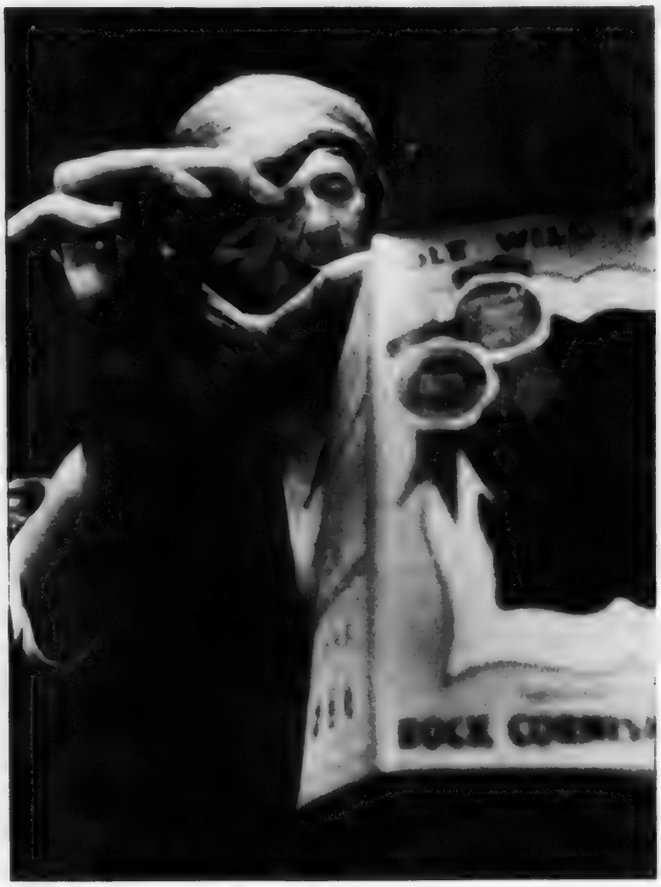
"We got through the rest of the wheat, then the oats and a little buckwheat. Those times the rig was started up along about dog days and you never got home until around Hallowe'en. We never had any real trouble that season, but I got my comeuppance that winter. We stack-threshed in the fall. Stack runs could wait 'til October or November. Then like most steam rings, we ran a sawmill in the winter. I learned a lesson I never forgot. You have to be on your toes all the time when you're handling fire and steam and power. We were hooked up to the saw and I was at the controls. I started her up and I didn't look down for a second. When I did, there was an old guy aholding on to the saw and it just happened that I had reversed the engine or I'd have split him in two. As it was, he was just thrown away from the saw."

When Walter threshes, Bill Ficken goes along, too. Bill is past seventy. "He's an old Dutchman," says Walter. "Can't keep him from blowing the whistle. Just deafens you. Have to keep telling him to blow her just a little, not open her up. He knows every bolt on her, just as I do.

(*Continued on page* 126)

Smoke belches, soot and cinders get into your eyes, chaff down your back. The separator drones, the engine hisses and puffs. It's hot and you sweat, but you love every minute of it.

By Grant Cannon



Growing, processing, and marketing must be combined to make a profit on this popular broiler cross

THE ROCK CORNISH ... a new industry

Photographs by Robert Goodman

The old fighting cock, the Cornish, is the sire of the meaty, squab-sized broiler. Jacques Makowsky, above, who started this new industry, inspects a package. He demands perfection in both birds and boxes.

THERE IS A hard-beaten road to a house in the Connecticut woods that costs the township a pretty penny to maintain under the heavy pounding of tractor-trailers. The road commissioner was warned that this would happen. A hundred years ago, his fellow New Englander, Emerson, wrote, "If a man has good corn, or wood, or boards, or pigs to sell, or can make better chairs or knives, crucibles, or church organs, than anybody else, you will find a broad, hard-beaten road to his house, though it be in the woods." This road leads to Jacques Makowsky's farm, where he raises a better chicken.

In 1949, Makowsky, a retired business executive in search of a money making hobby, decided to raise a brand-new bird for the poultry market. Both the bird and the brand were his own creations. The bird is a cross-bred, fast-growing chicken that reaches a plump, juicy market size in five weeks; the brand name he gave this new bird is the Rock Cornish Game Hen. Any of Makowsky's kindly neighbors in this broiler raising section of Connecticut could have told this beginning farmer that it was pure madness to think of raising chickens of this sort when the broiler industry was already feeling the effects of a surplus. Fortunately, he never asked for their advice.

Since then the Rock Cornish has caught the fancy of the public, sales have mounted, and hundreds of poultrymen have gone into the business. Some of these have been successful and some will everlastingly regret their experience with the squab-sized bird. One successful Rock Cornish raiser felt that he had put his finger on the reason some poultrymen make a go of this new business while others fail, when he said, "The farmer who succeeds with Rock Cornish has got to be ninety per cent salesman and ten per cent poultryman."

The flailing rubber fingers of a mechanical picker remove the feathers. Later the birds are individually inspected for bruises and sold as seconds if they are not perfect. The feathers and offal, used as manure and feed, from two million birds are a profitable sideline; smaller producers must pay to haul them away.

"It is true that promotion and salesmanship are important in this business," said Makowsky, who speaks flawless English with a soft Russian accent, "but I feel that if we left the matter there we would be missing the main point. It seems to me that the real lesson to be gained is this: the farmer who can visualize a demand and a market for a quality product and then go on and produce that product and exploit it to the limit will be successful. Others who copy his methods may also have some success and those who jump into the field with the idea of cheapening the product and making a killing *should* fail and probably will. That is the way it is in all business —there are originators, strong competitors, and cheap imitators."

Until he began raising his fabulous birds, Jacques Makowsky's closest association with chickens had been across a linen serviette at the Stork Club in New York or Maxim's in Paris. His non-agricultural background seems to be one of the most surprising things about this successful poultryman. It does not surprise Makowsky, however. Apparently there is little in life which can surprise this urbane, handsome man—least of all his success.

Eight years of farming have not changed Makowsky's appearance; he still looks like the successful intellectual and gourmet. At 62 he has an erect carriage and is tall enough so that he has the tendency to duck his head as he walks through a doorway. His face is that of one who knows all and accepts all even though he must occasionally shrug his shoulders helplessly at the nonsense of it all. Certainly, in terms of experience, he has lived many lives. He was born in Czarist Russia about the time two young men, Vladimir Ilyich Ulyanov and Lev Davidovich Bronstein, began taking an active interest in politics. Makowsky had learned the printing trade in his father's big publishing house and had earned a master's degree in law from Moscow University. He was married and had two children, and was an enthusiastic follower of the liberal, Kerensky, by the time Ulyanov and Bronstein, who were now known as V. I. Lenin and Leon Trotsky, returned to Russia from exile. Makowsky's life, along with the lives of all Russians, was drastically altered by the revolution which these men led. As capitalists, the family was suspect. The family business was nationalized, but Makowsky was permitted to continue working as a managerial employee. When, however, a printer inserted an anti-communist story in the middle of the Red Army newspaper which the plant published, Makowsky knew that he had but a few hours to get out of Moscow. He and his family quietly traveled south to Constantinople and then on to Paris.

In France, Makowsky was able to secure a small printing house and, within a remarkably short time, to establish himself as one of the finest printers and publishers in the country. A particularly rewarding part of his business was the designing, printing, and manufacturing of boxes and packaging materials for expensive cosmetics, perfumes, and other luxury items. He was a success, but once again events of world-shaking importance took a hand in his life. This time a man named Schickelgruber who had changed his name to Hitler, returned to a conquered France. Makowsky was a marked man—he was a Russian in a foreign country, a liberal, a known anti-Nazi, and even his anti-Communist background wouldn't help since this was during the

Nazi-Soviet pact. This time he had but minutes to get out of the country. During his stay in Paris, Makowsky had been divorced by his first wife and had remarried and had three children; when he escaped he was able to get both families out of France.

Within weeks of his arrival in the United States in 1940, Makowsky was back in the fine printing business. He even managed to hold on to most of his old customers and, by aggressive salesmanship, capture new markets. "The boss was a real buster in those days," Bill Larson, vice president of the poultry business said. "I was working for him then as his chauffeur and I know. We'd leave the house at eight in the morning and get back around nine at night and he'd be on a dead run all day long."

By 1948, Makowsky had amassed a modest fortune, but in doing so he had become almost a stranger to his family. He decided to retire. Therese, his wife, found a rolling, wooded farm near Pomfret Center, Connecticut, which consisted of 186 acres of trees, cliffs, ponds, streams, and other scenic wonders, and 10 acres of tillable land. Makowsky sold his business and the show place he had built on Long Island and threw himself vigorously into a life of idleness.

"I had not been retired very long before I began to realize that perhaps I'd been just a little premature," he said, reminiscently. "An idle farm can cost a lot to maintain—and ours was so idle and rugged that we had named it Idle Wild. And then there were Jeannette, Josette, Jean Jacques, and James Dimitri to be put through college, a costly project. We decided that we ought to think of a crop which would make the farm, at least, self sustaining. Our search was for a crop that would bring a rather high unit return and one which was not being produced abundantly, but which would have a market."

Makowsky, with his knowledge of the luxury trade, felt that he had hit on two such crops when he decided to raise wild turkeys and white guineas. The fine restaurants of America, he felt, would provide a steady market for these birds and certainly they were not being produced in abundance. It did not take him long to find out why.

The turkeys, which he imported from the South, required acres of screen covered runs to keep them from taking off into the wooded countryside; they were also reluctant and furtive egg layers. The eggs they did lay they hid in some remote corner. The white guineas were more nearly Makowsky's dish. He raised these broad-breasted, pin-headed birds to a squab size so that when killed and dressed

The broiler's last flight is head down on a conveyor chain as it goes to the killing room. Factory techniques are used to cut processing and packaging costs.

they made an elegant individual serving. Restaurants which had once valued Makowsky as a customer began buying and featuring his fine birds. In 1949, when the Makowskys were shipping around 500 birds a month, they became acutely conscious of a new problem. Once they decided to go into this new venture the entire family had become avid readers of books, articles, bulletins, and leaflets on poultry and they learned that the guinea hen is a seasonal layer. A simple explanation of the situation, they felt, would hardly keep their customers satisfied during the off season. The restaurateurs, who regularly served tender new peas, fresh cut asparagus, and tropical mangoes on the bleakest December days, were far more interested in securing a steady supply than they were in learning the facts of a guinea's sex life.

Disaster spared Makowsky the ordeal of attempting an adult education campaign—his one big coop burned down to its concrete foundation, incinerating his flock of birds. Makowsky, who had survived the fall of France without losing his major customers, wrote to his clientele announcing the fire and telling them that he would soon have a substitute bird ready for their ovens to fill the gap while he rebuilt the guinea flock. Then he began his search for such a bird.

"We had read a great deal about the game bird that had been bred for centuries to produce fighting cocks. Its short, heavy legs and broad breast made it one of the meatiest birds for its size; the meat was unusually sweet and juicy, but unbelievably tough. Another drawback in using this bird is that the hens are very poor layers. We felt that if we mated this bird with a heavy laying, meat-type chicken we might come up with a cross that would retain the flavor, juiciness, and meatiness of the game bird along with the tenderness and productivity of the dual-purpose breed."

Makowsky and his ex-chauffeur Larson, who had stayed with him through the guinea-raising period, made a number of game bird crosses and finally hit on a cross between white Cornish cocks and White Rock hens. These had the best characteristics of both breeds. The young are shorter and thicker of leg and broader of breast than the normal chicken; their meat is sweet and juicy and has a tantalizing suggestion of wild game in its flavor; and all of the meat is white—a fact that Makowsky has not ignored in his advertising. In addition to all of this, the meat is as tender as capon, though this may be due as much to the fact that the birds are slaughtered at five to six weeks as it is to their breeding. This early marketing of the bird was a carry-over from the guinea business where one

(*Continued on page* 120)

Farmers (and their wives) raise the birds on contract; chicks and feed are furnished by Makowsky, who also pays for heat and light.

This is what happens when a hobby gets out of hand—from a family project it grew explosively to a 200-worker packing plant.

The best possible feed has finished these birds ready for market in five weeks.

A comparison of Makowsky's bird with an imitation Rock Cornish shows the difference in breast and leg size. Both breast and leg meat are white.

Uniformity of size is vital; these 24-ounce birds dress out at a pound.

for quality irrigation pumps,
MORE BUYERS
BUY MYERS
Myers® The F. E. Myers & Bro. Co.
Ashland, O.—Kitchener, Ont.

TAKES THE NUISANCE OUT OF RED WATER
A Diamond Iron Removal Filter . . . takes the discoloration out of bowls, tubs, sinks — rust spots out of freshly laundered clothes
Water is colorless, sparkling clear, palatable. Write for information
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PAYMASTER
A Great New Strawberry
A sparkling new midseason variety. The fruit is large, firm and very sweet. Bright red clear thru. Best for home freezing and market. Heavy producer, absolutely resistant to Red Stele. Also Armore, Scarlet Beauty, Jerseybelle, and many others. Write today for FREE color catalog.
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New
UNIVERSAL
Jet System for deep or shallow wells
If you want abundant cheap water, it'll pay to install a new UNIVERSAL high quality jet water system. You'll save on initial cost. Universal package systems are low in cost and inexpensive to install. You'll save on repairs. Universal jets are rugged built for years of dependable service. There's only one moving part and it's above ground. You'll save on power. Universal jets provide more water per horsepower than other pumps their size and operate only when they are pumping water. Wide choice of models for shallow or deep wells to meet your exact needs.
FREE! SEND FOR INFORMATIVE BOOKLET.
UNIVERSAL PUMP
3333 Eastshore Highway, Richmond, California
Please send free bulletin and name of nearest dealer. Depth of my well is_____feet.
Name_____
Address_____
UNIVERSAL OFFICES ALSO IN: Atlanta, Ga. . . . Binghamton, N. Y. . . Dallas, Texas . . . Los Angeles, Calif. . . . Louisville, Ky. . . . Minneapolis, Minn. . . . Monterrey, N. L., Mexico . . . Orlando, Fla. . . . Portland, Ore. . . . Richmond, Va. . . . Sacramento and Stockton, Calif. . . . St. Louis, Mo. . . . Toronto, Ontario, Canada

ALL ABOUT HYDRAULICS

(*Continued from page* 55)

Corn Pickers. A "position-responsive" rockshaft will keep the picker at a constant height over rolling ground.

Cultivators. At the end of a corn row a touch of a lever will lift the front gang of cultivators, either right or left, or together. In a couple of seconds another lever will lift the rear gangs.

Disks. Transport wheels can be dropped to the road by a hydraulic cylinder on big disks for moving them along the highway. After they are on the field, the wheels are raised out of the way and the angle of bite can be controlled by another hydraulic cylinder.

Planters and Drills. There is no need to get off the tractor to raise or lower the planting spouts and disks. These can be given precise hydraulic lift control for turning corners, crossing waterways or for moving to other fields.

Loaders. Manure, fill dirt, fertilizer, or just about any bulk material can be handled with the basic loader mechanisms. Hydraulic cylinders control the lift and also are used to tilt the bucket or fork. For heavy grass silage in trenches, a set of tines can be dropped over the top of the load to help pull it loose.

Two-Way Plows. A three-way hitch lifts the plow. A cylinder mounted on the plow will roll it over at the end of the row and hold it in position. The utility of this plow is greatly increased.

Power Steering. A number of the new tractors now offer power steering as an extra. Users say this is one of the greatest aids a farmer can have in bedded or irrigated land, over rough ground, or in operating with heavy tractors, using front mounted tools. One of the pioneers in the power steering use of hydraulic power was the John Deere Company. Their power steering is engineered into the steering mechanism at the factory and is an extremely simple mechanism. The hydraulic cylinder which is well-protected in an area below the radiator, encloses a simple vane which is attached directly to the steering spindle just above the wheels. Turning the steering wheel to the right or left actuates a control valve which directs high pressure oil to rotate the vane: either to the right or left. This vane is bolted to the wheel spindle. A gear-driven pump mounted just back of the cooling fan is assigned the job of providing high-pressure oil for this steering mechanism; the power steering operates whenever the tractor engine is running; regular manual steering takes over when the engine is shut off.

What We Can Expect

Hydraulic steering and power brakes are going to be available on all tractors within a few years. For the bigger tractors there will also be hydraulic transmissions.

The Sheppard SD-4, a big husky Diesel

MAYRATH
has ONLY 2 ADVANTAGES
1. The Best Machines
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MAYRATH
DODGE CITY, KANS. COMPTON, ILL.
World's Largest Selling Augers and Elevators

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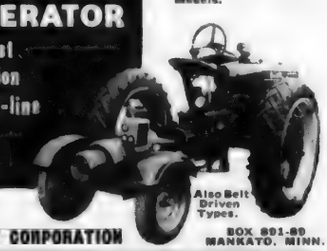
DIRECT TRACTOR DRIVEN GENERATOR
Low-Cost Protection from Hi-line Power Failure.
NO BELTS!
Quickly attached. Up to 25 KW. 1 or 3 phase. Capable of continuous duty. Also stationary models.

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Our 34th year. Heavily improved with R.O.P. bloodlines from world famous breeding. White Leg., WestLine Strain Cross Leg., New Hamps, White, Barred, Buff Rocks, Wyan., Buff Orp., Reds, White & Blk. Giants, Lt. Brahmas, Anconas, Blk. Minorcas, Br. Leg., Hamp-Rocks. For Broilers — Holtz-apple White Nicks, Wyan-Rocks, Wyan-Hamps, Granite Whites. Pullorum Typhoid Clean. Early Order Discounts. Free 24-page Catalog.
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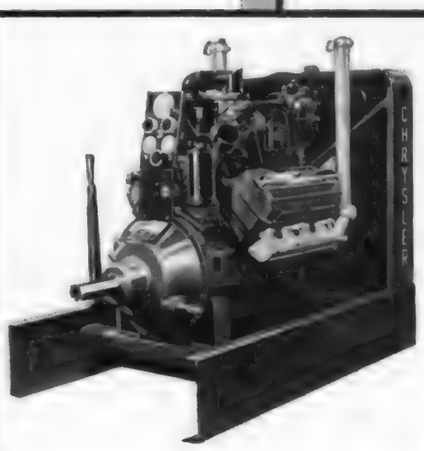
An Open Letter to the Farmer About to Power (or Repower) an Irrigation System:



under-square
SMALLER BORE THAN STROKE

square
SAME BORE AND STROKE

Chrysler over-square
LARGER BORE THAN STROKE

Your irrigation system is an investment that can earn you big returns. You've satisfied yourself on that score. Therefore, you've planned carefully. Chances are you've been over your requirements a good many times with the county agent and your equipment dealer. Every factor has been thoughtfully considered and laid out.

Now that it's time to select the power for your irrigation system, don't make the mistake of installing a second rate engine. Pumping water for irrigation is a rugged, continuous operation. It requires a heavy-duty industrial engine (not a passenger car engine), an engine that is factory-designed, factory-built and factory-equipped for irrigation service.

For fifteen years Chrysler Industrial Engines have been the number one engine for irrigation in the Southwest where high-capacity deepwell turbine pumping came into its own. Chrysler Industrial Engines met the requirements with heavy-duty, forged steel, induction-hardened crankshafts with Chrysler-exclusive undercut fillets for extra strength, tri-metal crankshaft bearings, extra-hard stellite valve faces and valve seat inserts, positive-rotation exhaust valves, twin concentric stainless steel valve springs, dirt and moisture-proof electrical system.

Today's Chrysler Industrial Engines are even finer irrigation engines. In the first place they are what the engineers call "over-square, short-stroke design" engines. (See drawing at left.) With this construction, piston travel is less than half of that in some competitive engines. Piston speed is proportionately low, thereby reducing bearing loads and increasing engine efficiency.

After you've carefully estimated your irrigation requirements — don't underestimate your irrigation power requirements. Allow for future expansion too. Remember: *Optimum yields result only when both power and pump meet the farmer's needs.*

The neighboring Chrysler Industrial Engine Dealer will be glad to discuss your power requirements. He has every top-notch facility for service, too. See him or consult your irrigation equipment dealer. Or, if you prefer, write direct: ***Irrigation Engines, Dept. 22F.***

Industrial Engine Division
Chrysler Corporation
Trenton, Michigan

HORSEPOWER

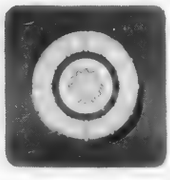
WITH A PEDIGREE

When Tractor Hydraulic System has a VICKERS® Balanced VANE TYPE PUMP

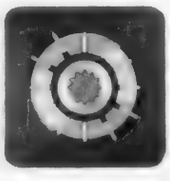
Under the very best conditions, cold weather puts a strain on starting equipment. Every part of the engine is stiffer, and the cold seriously decreases the power of the starting battery. If the hydraulic system has a pump with fixed teeth or lobes, this starting load may be seriously increased above normal

Vickers Balanced Vane Type Pumps *start at practically no load.* At rest and at normal starting speeds, the sliding vanes are retracted . . . only after the engine fires do the vanes extend and pumping begins. As a result, cold weather starting is much easier when a Vickers Vane Type Pump is used.

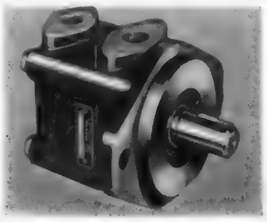
Make sure the hydraulic pump on your next tractor is a Vickers Vane Type Pump.



Schematic diagram of Vickers Balanced Vane Type Pump showing how sliding vanes are retracted at normal engine cranking speeds. No oil is pumped and there is practically no starting load.



Similar diagram of Vickers pump showing how pump vanes are extended when engine is running. Pumping then begins and continues at all engine speeds.



Vickers Balanced Vane Type Pumps for mobile equipment are available in several basic sizes and delivery ratings suitable for all farm tractor applications.

7658

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

tractor, is the first wheel tractor operating with a hydraulic transmission that is in production and on sale today. The extra cost of this torque convertor transmission, however, may discourage many farmers. The other disadvantage, a loss of traction due to some slippage when the load suddenly becomes very heavy, and during starts, when the efficiency of power transmission may drop 15 per cent with an inexperienced operator, is easily offset by the fact that the Diesel engine has power to spare and the fuel cost is very low. The advantages are great to the big farming operation with many hours of field work. There is no engine stalling under heavy loads; the gear shifting and clutching is cut up to 90 per cent with a resulting saving in repairs and maintenance. On the Sheppard, with its 10-speed transmissions, this added flexibility of hydraulic power gives it a real look of the future.

Certainly such difficult power transmission jobs as we see on manure spreaders will be powered by hydraulic motors to eliminate chains, sprockets, and headaches. Mowing machines will finally shed the pesky Pitman and all their shaking and vibration when engineered-in hydraulics provide the cutter-bar power.

The grain combine of the future may well have a control pedestal like an airplane with the engine driving a big hydraulic pump. The wheels will be individually hydraulically driven with feather-light controls for maneuvering. The cutter bars and the reel will be hydraulically driven with accurate adjustments for various kinds of grain, as well as for light and heavy stands.

Hydraulic power seems to be geared to the farm kind of ruggedness. It should take a lot of the pull and strain out of farming in the future as it is put to work in more and more tools.

STOLLERS SEEDS

Are Used More and More as Our Farmers Realize Better Crops Grow From Quality Seeds

For Prices or Information on All Field and Lawn Seeds We Are Ready to Serve You

STOLLERS SEEDS—Paulding, Ohio

MASTER MECHANICS TOOLS
direct from the factory

Buy the same *Snap-on* tools used and preferred by professional mechanics. Superior quality from forgings to finish. *Snap-on* tools work better, last longer, pay for themselves over and over. Start a basic set now . . . add other tools any time.

Snap-on tools are not sold in stores . . . buy direct from factory or from the *Snap-on* man who calls on local garages. Write name and address in margin and mail this advertisement for illustrated FREE catalog.

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8019-L 28th Ave., Kenosha, Wis.

"AN EATON 2-SPEED AXLE HELPS ME RUN 5 FARMS PROFITABLY"

...says Farmer Elwood W. Follweiler, New Tripoli, Pennsylvania

"I GROW wheat, potatoes, corn, oats, fruit and hay on 400 acres," reports Mr. Follweiler. "This acreage, divided into five farms, is spread over the countryside. Separate tractors for each of the farms would be too costly; to drive one under its own power to the job takes too long. So I made a wise move—I bought an Eaton-equipped GMC truck.

"After finishing work on one farm, the tractor is run up on the truck and hauled piggyback to the next farm. Soft, freshly plowed fields and steep hillsides frequently stop conventional trucks. But with the low-gear pull of the Eaton 2-Speed Axle, my truck rolls through easily, safely, without bogging down.

"Often we haul crops or equipment into town—20 miles each way. Even with a full load, Eaton's high-gear range assures maximum legal speeds—and saves gasoline, too. I'm sure pleased with the profit-making performance of the Eaton 2-Speed Axle."

See how the Eaton 2-Speed Axle saves time, cuts costs. Ask your truck dealer for a demonstration.

"DESPITE STEEP GRADES, Eaton's versatility moves my truck along at time-saving speeds," remarks Mr. Follweiler. "Uphill, I shift into low axle gear. Back on the straightaway, I shift into the high-gear range. And I can change at any speed from one gear range in the axle to the other quickly and easily."

GMC DEALER WILLIAM F. DEIBERT, in Allentown, sold Mr. Follweiler his GMC truck. "It's obvious why Eaton 2-Speed Axles are favorites among farmers," says Mr. Deibert. "They travel fast with lower RPM in the high-gear range, supply extra pulling power in the low-gear range. That's why 99 per cent of the trucks we handle are Eaton-equipped."

EATON

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

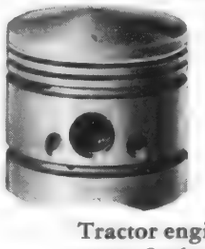
P.A.R.

PROJECT ADEQUATE ROADS: America is outgrowing its highways. Back the better roads program in your state.

Let Sealed Power Ring Sets make your winter overhauls more effective

Winter is overhaul time for farm engines. Because parts are only a small proportion of the total overhaul cost, it pays to use the best quality parts you can buy—including Sealed Power KromeX Ring Sets.

Dust and grit can't damage the chrome-faced compression rings and chrome-faced oil-ring side rails in Sealed Power KromeX Ring Sets. That's what the chrome is there for—to fight friction, abrasion, corrosion and heat.



For piston replacement, be sure to use Sealed Power PX Pistons—designed with extra strength where it's needed most, and factory-fitted with Sealed Power GI-60 Groove Insert, for longest top-groove wear.

Tractor engines deserve the extra quality that's built into every Sealed Power Cylinder Sleeve Assembly—sleeve, piston, rings and pin all factory-matched to do the finest possible job of giving you maximum power with minimum oil and fuel costs.

WRITE FOR YOUR FREE COPY of "Care and Feeding of Engines," a 24-page illustrated manual containing dozens of useful hints for making your expensive farm engines last longer. A postal card with your name and address will bring it. Sealed Power Corporation, Dept. F-12, Muskegon, Michigan.

Sealed Power Piston Rings

BEST FOR RE-RING! BEST FOR RE-BORE!

Sealed Power Motor Parts: Rings, Pistons, Pins, Sleeves, Valves, Water Pumps

WINTER TUNE-UP FOR TRACTORS

(*Continued from page* 61)

saved me the cost of a valve job for the price of a spark plug. When I told the dealer about it, he went out and bought equipment for testing plugs and compression. I still wish he'd get himself a dynamometer."

When you consider that the dynamometers used by the University run anywhere from $10,000 on up and that smaller commercial models run from $3,000 to $6,000, it isn't surprising that dealers don't rush out and buy one. An exception to the rule was Herbert Glesmann, a graduate agricultural engineer from Nebraska, who had a chance to see the value of the dynamometer tests in checking tractor maintenance.

Glesmann, who joined his brother Paul in the operation of a tractor sales agency at Papillon, Nebraska, didn't exactly rush out and buy a dynamometer either. With his knowledge of engines he built his own, using a Ford V8 engine with an adjustable valve in the exhaust line so that it became, in effect, a compressor. This he cradle mounted and attached to a scale beam to record torque.

To introduce their new device to a skeptical public, the brothers advertised the tests being done at the Nebraska University and offered to give a free test using their own machine on the day of its unveiling. They had so many tractors lined up for the demonstration that it took them several days to run through the demonstration—but it sold the tune-up process to the farmers nearby.

"Our machine didn't cost us much except my labor—and I guess I'm enough of a farmer to forget to charge up my own labor—but from the business it's brought in I now believe that a commercial model would not have been a bad investment," Glesmann said. "We have machines in the shop that cost us a thousand that aren't used a tenth as much.

"It also has a psychological effect, I think," he continued. "As you would expect, some farmers did a good job of keeping up their tractors and so they did not get the boost in power that some of the neglected machines made, but everyone drove out of the shop feeling that their machine was running much better."

The wide variation in the care given tractors was one of the findings of the Nebraska tests. The farmers whose records showed that they were doing the best job of upkeep suffered the least loss of power during the year and, consequently, made the smallest gains when their tractors were tuned-up.

One of these men, Alvin Brehl, whose tractor regularly came into the shop waxed and polished—because that's the way he keeps his equipment—found that his tractor engine gained only slight additional power from the tune-up. "I still think that I gained a lot by participating

. . . . . ALL NEW **JOHNSON** *"Work Horse"*

HYDRAULIC LOADERS

MODEL 7000
WITH UNIVERSAL MOUNTING FOR ALL 2-4 PLOW, ROW CROP OR WIDE FRONT TRAC TORS.
MODEL 8000
FOR ALL FORD, FERGUSON, OLIVER 55, IH 300 UTILITY CASE 300 UTILITY, MINNEAPOLIS MOLINE NEW 445 AMPLI-TORC UNIVERSAL SERIES AND UTILITY MODEL TRACTORS.

You'll like the new Johnson "Work Horse" Hydraulic Loader! Every time you mount and dismount it, you'll like it better, because it takes only a fraction of the time and work of conventional models. (Only 2 nuts on each side need to be tightened or loosened on the Model 7000!) And that's just one of the many features you'll prefer in these all new loaders.

COMPARE THESE FEATURES

- ★ New "Fast On, Fast Off" Mounting.
- ★ All Hydraulic—double acting lift and tilt cylinders operate off tractor hydraulic systems. (Optional)
- ★ Easy access to tractor seat from either side.
- ★ "Work Horse" quality manufacture throughout . . . all pins hardened, plated and locked from turning.
- ★ Quick coupling hoses. (Optional)
- ★ Full line of attachments for year around use. One tilt control system operates all attachments.

These New Loaders Will Save you Time, Money and Plain Hard Work. Mail The Coupon Today!

JOHNSON HYDRAULIC EQUIPMENT CO.
515 W. 78th ST., MINNEAPOLIS 23, MINN.

JOHNSON HYDRAULIC EQUIPMENT CO.
515 W. 78th St., Minneapolis 23, Minn.

Please send complete information on the new Johnson "Work Horse" Loaders.

NAME.....

ADDRESS.....

CITY.....STATE.....

Tractor Make.....Model.....

in the tests," he said. "Installing the hour meter on the machine made it possible to keep track of tractor use—and you'd be amazed to find how far off you can get when you estimate tractor use for odd chores mixed in with your regular work. I had a good routine established on daily up-keep, but keeping records on the jobs that are only done occasionally and then *doing them* certainly lengthened the life of the tractor and gave me more economical use of it."

Professor Smith and his associates who ran the tests don't emphasize the lengthening of the tractor's useful life—they are perfectly willing to rest their case for proper maintenance on the immediate improvement. With tractors costing around $70 per horsepower, they point out, the average farmer who took part in the tests regained around $170 worth of lost power each year. It was a farmer whose tractor picked up a little over the average who figured it would have paid him $10 a page to read the operating manual. "They didn't do a single thing to my tractor to pick up that lost horsepower that wasn't mentioned in the manual," he explained, "and even if I was too lazy to do it myself, it would have paid me handsomely to take it into my dealer and have him do the job for me."

When you buy a farm hoist, figure your last cost first!

***Dump* IT® hoists cost less to own because they last longer!**

You can't always see or touch the quality in a farm hoist, but you *can* measure it . . . by the dollars you have to spend over the years for parts and maintenance! Farmers who measure quality this way choose DUMP IT hoists, built by Gar Wood-St. Paul. They're backed by a 44-year reputation for smooth, trouble-free performance, lowest operating and maintenance costs, unmatched dependability. DUMP IT farm hoists are always ready to work *when* you need them, sure to save time and labor year after year. Remember, figure your *last* cost *first*, and specify DUMP IT hoists for *longer* life, *less* maintenance at *lower* cost! Available in 6½- to 14-ton capacities, for all body and chassis lengths.

GAR WOOD INDUSTRIES, INC.
Wayne, Michigan • Richmond, California

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Customer Service Dept. FQ-4
Gar Wood Industries, Inc.
Wayne, Michigan

Please send latest free literature on DUMP IT farm hoists.

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for honest-to-goodness
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WORK . . .

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COMPARES WITH
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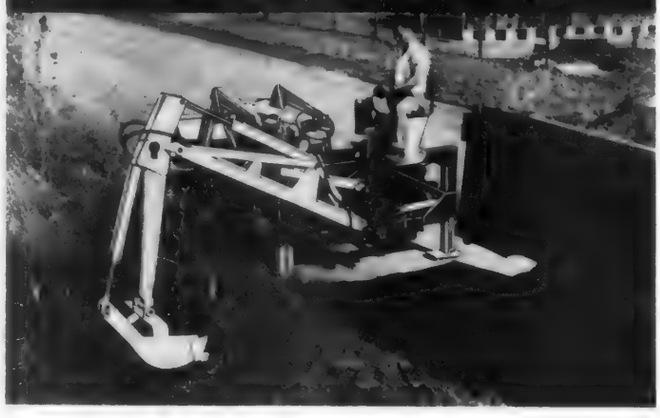


For real honest-to-goodness value you can't beat a Davis Loader or Back-hoe. These are the real leaders of their class. First in streamlined, efficient design; setting the pattern for the industry. First to utilize mass production techniques for uniform, quality construction. First in versatility...the loader has many attachments, and the back-hoe digs where others won't. And the price is down to earth. You get more for your money, feature for feature, pound for pound, and dollar for dollar than with any comparable equipment. Available for most tractors.

See for yourself where Davis Products are sold and serviced nationwide by better dealers, or write for free literature

MID-WESTERN INDUSTRIES, INC.
1009 SOUTH WEST DEPT. F WICHITA, KANSAS

HORSERADISH KING

(*Continued from page* 67)

Silver Springs horseradish fields are under complete irrigation. Huntsinger was one of the first Wisconsin farmers to use irrigation. "I was sold on irrigation long before horseradish became our big crop," he says. "The second year I came back to the farm I put out two acres of strawberries in a field around a big pothole. About the time they started to bear one of the worst drouths in history struck us. I borrowed a pump from a neighbor, some hose from the highway shops, and rigged up a small gasoline engine—pumped water out of that pothole day and night and saved my berries. Made $2000 on that crop and that's the money that I put down on the Silver Springs farm. One of the first things I bought for the new farm was a second-hand fire truck to pump water out of the river."

The few pests that attack horseradish are not serious. A virus disease known as the white rust, and a beetle, which is easily controlled by DDT, are the most common. Down in the St. Louis area the industry was almost wiped out at one time by a disease known as "brittle root." This is seldom encountered since the growers have been using northern cuttings.

It costs Silver Springs around $250 per acre to produce a crop of 2 to 3 tons. The big cost is labor, which reaches a peak during the digging season when the root must come out of the ground in a hurry. At this period in the fall, a force of 200 workers are in the fields, operating diggers, toppers, and trucks. The company's 26 tractors (half of them track type) and 25 trucks are all busy when the roots come up.

Field to Bottle

When the roots are taken out of refrigerated storage, they are dumped into churn-like washers and scrubbed white and clean. Scrubbing is a 2-4 hour operation, but the roots are not peeled. From the washers they go to the grater and then the mixer, where cream, vinegar, salt and sugar and other seasonings are added. From the mixer the finished product goes to the bottlers, an assembly line operation which turns out a carload of sealed and labeled 5-ounce jars a day.

The bottling plant is in operation the year 'round and employs 40 workers. Since all machinery is automatic, the workers mostly sit by and watch the machinery do the work. Big exhaust fans keep the building free of fumes.

The Butler pre-fab buildings used on the farm include a shop, four cold storage buildings, a building for cream storage (700 to 800 gallons are used each week), a machine storage building, and the plant and office.

Silver Springs puts up five kinds of horseradish mix: creamed horseradish, the biggest seller; a mustard and horseradish relish for hot dogs; a cocktail sauce; a beet and horseradish mixture for the Jewish trade; and the plain horseradish for those who want the old product.

The standard bottle holds 5 ounces and is shipped in refrigerated trucks or cars. The constant emphasis on low temperatures is characteristic of the horseradish business. "To keep it hot, keep it cold," is a slogan. From field to the housewife's table, the root is never long away from a 32-degree temperature.

Currently, a 5-ounce bottle of horseradish costs the housewife between 20 and 25 cents. Of this, Silver Springs gets about a dime. Silver Springs sometimes buys roots from other farmers. This year the price has ranged from 7 to 10 cents a pound. Two years ago when the drouth struck, the price went to an all-time high of 50 cents.

The horseradish business at Eau Claire operates as two separate corporations. The plant is Silver Springs Garden, Inc., and the farm is Huntsinger Farms, Inc. Huntsinger Farms, Inc., charges Silver Springs Garden, Inc., the going price for its horseradish root and each must stand on its own feet.

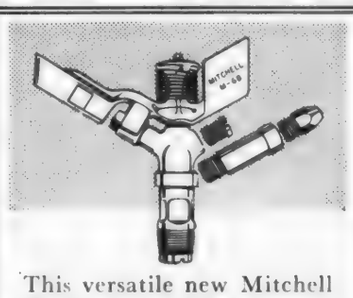
There are two desks in the tastefully panelled office, and one leather easy chair for the head of both corporations, Ellis Huntsinger himself. One desk is for Ed Bartusch, Huntsinger's 35-year-old son-in-law, who is the front man for the operation; and one for Gene Huntsinger, Ellis' son, who manages the farm and

the factory. The company owns a Cessna 195, which Ed, a former bomber pilot, uses for business contacts. Ellis gets a new Cadillac each year for business purposes.

Ellis has the last word on the finished product; he has the educated tongue and does the tasting. The recipe is not secret —good Wisconsin horseradish, good vinegar, cream, salt and sugar to taste. The company has patents on the cream mixture, but is not disturbed when small operators infringe on the patent. "They are not serious competitors," says Ellis, "and we don't think it's worth a suit."

While relatively few acres grow all the horseradish for U.S. tables, there is small chance for additions to the acreage. A 5-ounce bottle of horseradish will last the average family from a week to two weeks, and the four or five areas now in production are doing quite well in supplying the market. Because of the special machinery required to plant and dig the crop, and the necessity for expensive storage and processing machinery, horseradish is not a crop to be started on a shoestring or at a moment's notice. Ellis Huntsinger has been working in horseradish for 25 years.

Horseradish has virtues unsuspected by the ordinary gourmet. Traditionally used as an condiment for meat, especially beef, it can be used with vegetables. When heated it loses its kick, but the flavor lingers on and enhances ordinary flavors. The flavor of a baked ham is improved if covered well with horseradish before it goes in the oven. Silver Springs Garden, Inc., Eau Claire, Wis., will send the curious a horseradish recipe book on request.



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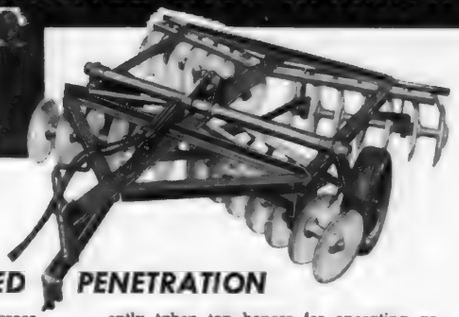

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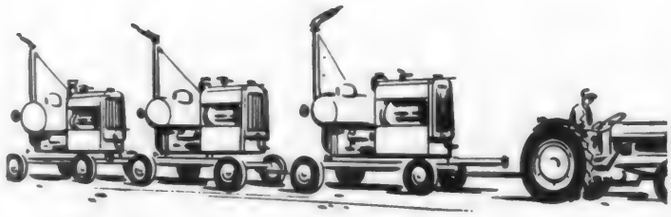

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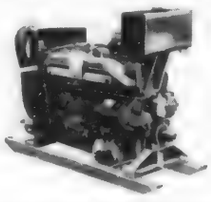
SPECIFIES HERCULES POWER FOR NEW IRRIGATION EQUIPMENT

Photo courtesy of Llewellyn Machinery Corp. Miami, Florida

Here's how to have water where you want it and when you need it. Mr. Ivan Maser, Manager of Sunland Grove Development Co., Homestead, Florida, has found the right combination for his irrigation needs.

Three Hercules Model RXC Power Units operating on L.P.G. pump water from drilled wells and power three new 1000 G.P.M. portable sprinkling units. Each unit irrigates 2½ acres. After approximately one hour operation, the units are moved to another well and then the process is repeated.



The special Hercules irrigation engine, at right, is available for operation on Gasoline, L.P.G. or Natural Gas. Six models from 141 to 404 cubic inch displacement are produced as complete irrigation engines ready to operate your pump.

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FIGHT FROST WITH IRRIGATION

(*Continued from page* 41)

a year in advance of harvest, there is no chance for a later planting. That is why Deaner and other growers are as alert to the frost danger as a western sheep man is to signs of mountain lions on the summer range.

Deaner and the dealer who sold him his system, Robert Palmer, believe that the only safe way to protect a crop is to get out every half hour on every night when there is a danger of freezing. "I'll admit that this is a tough schedule," Palmer said. "I have seen some of the boys around here so red-eyed and tired toward the end of the frost period that they could not sit down without falling asleep, but they saved their crops. I know that a lot of farmers depend on a thermostat and an alarm system to warn them of frost and some even wait for their neighbors to start irrigating before they start. I don't think you can count on the neighbor and I don't believe that an alarm system is yet the answer. If a man could place two or three thermostat alarms in different parts of his field and attach them to a real loud bell that would wake the dead—and you feel like you're dead after a few nights of fighting frost—I'd use the alarm system, but I'd probably still worry. Frost is so tricky. I've seen one field where the temperature was 35 degrees and right across the road I've got a reading of 30 degrees on a field that was exactly the same level. Frost is like that. *Usually* it hits the low places first—but just often enough to ruin a man, it doesn't. I've seen the top of my car frost over when the temperature at ground level where the plants live was well above freezing and occasionally I've seen fields on high land get hit before frost touched the bottoms. *Usually* it is coldest just before sun-up, but a frost can hit at noon. I've seen a cloud drift over the field and raise the temperature five degrees by reflecting back the escaping heat and then float on and the thermometer drops back down. And almost always the frost hits first on the dark, humus-filled soils that we think of as warm soils, before it gets the lighter land. That's why I always advise the farmers who buy their equipment from us to go out and make sure for themselves every night there is a danger of frost.

"Another thing I tell them," Palmer continued, "is to use good thermometers. Maybe that sounds silly, but I've seen farmers put thousands of dollars into irrigation equipment and then depend on give-away advertising thermometers to tell them when to use it. And the best ones only cost a couple of bucks. Once I put my own thermometers out in customers' fields and then went around on a cold night and got the farmers to compare readings. Some of them got readings that were five degrees off. It really shook them. Another thing that will shake them is to have buds opening up and frost hit them before they have their system set up and tested. But you don't find Frank Deaner caught that way."

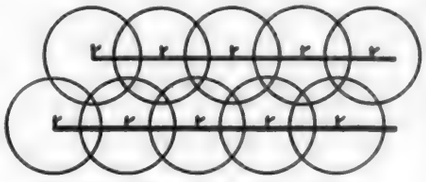
Last year, Deaner got his equipment out by the middle of April; next year it will probably be out even sooner. "Each year," he said, "I have been getting the pipes out earlier. In '54, when I first started irrigating for frost, I had the system set up about five days before I needed it and every year since I've been getting it out earlier. It gives you a nice Boy Scout feeling to know that you're prepared."

Deaner's system consists of a six-inch main line running from a pond, which he keeps filled from a deep well, to the fields where he lays the four-inch lateral lines. Since frost control irrigation uses little water—the University recommends from a tenth to an eighth of an inch an hour—he spaces his laterals 90 feet apart rather than the 60-foot spacings he uses for summer watering. He also cuts down on the water he spreads by plugging the range nozzle of his sprinkler and inserting a 5/32-inch tip on the spreader side. This has given him good frost protection even though it sprinkles less water than the amount recommended by the University. To insure full coverage, he spaces his sprinklers along the line in a triangular pattern such as that shown on the opposite page. With 100 pounds pressure at the pump, he maintains 60 pounds pressure at the nozzles, which breaks up the stream into a fine mist.

Once he has his system laid out to give complete coverage for

the 25 acres of strawberries, he doesn't move it until the danger of frost is past and he's ready to start using it to water the berries and a half dozen other crops on his 385-acre farm.

Testing the system before it is needed and draining it after each use are other good practices that Deaner believes in. "I remember one night a couple of years ago when the first frost hit. I was just starting my system going and Bob Palmer had dropped by to see how I was doing. A neighbor of mine rushed over and told us that he couldn't get his pump to hold its prime. We dropped everything and went over to help—during frost time around here we all lend each other a hand, it's a tough time, but a friendly one. We fussed around with his pump while the temperature dropped and finally Bob pulled the intake pipe out of the pond. We found that it was jammed with mouse nests—string, feathers, straw, paper, everything. We got the water running before the crop was damaged, but we all learned a lesson. Once I got a rabbit in my system. He went through except for his head, but he must have stretched out five-feet long when he was blown out the nozzle.

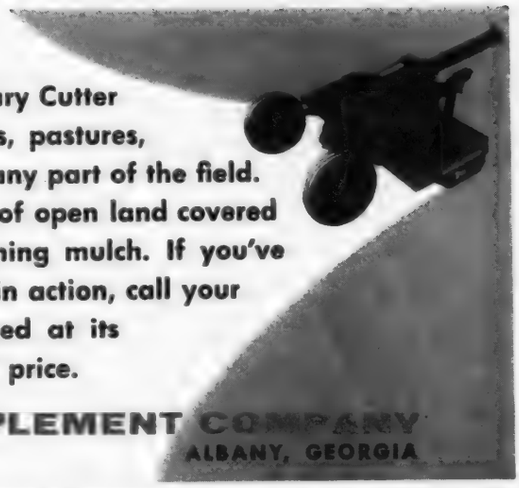


This 90 by 90-foot triangular spacing gives excellent frost protection coverage.

"When you need your system, you want it to start. And once you start irrigating for frost you keep it going until the sun is out and all of the ice is melted off the plants. If I had an alarm system that would warn me if anything went wrong in the field I might be able to catch a little sleep once the system was started. But I don't, so I just go right on patrolling. And things can go wrong. One night I blew off a sprinkler head—it looked like old faithful in the moonlight—and once I lost an end plug. It didn't take long to fix, but I could have lost the crop if I hadn't been there."

Sprinkling will save the crop, but there are some problems that come from the sprinkling itself. Usually they are the result of overwatering, either through too large a nozzle size or because the system had to be used night after night to fight frost. Too much water in the soil can slow down the bacterial action which releases fertilizer to the crop and gets it off to a poor start. Some farmers have also reported that fertility was leached out of the root zone. Deaner and other growers are fighting this problem by putting extra fertilizer in the ground and through the system in the first irrigation water they apply.

Tougher results to combat from over-irrigation are leaf spotting on some varie-



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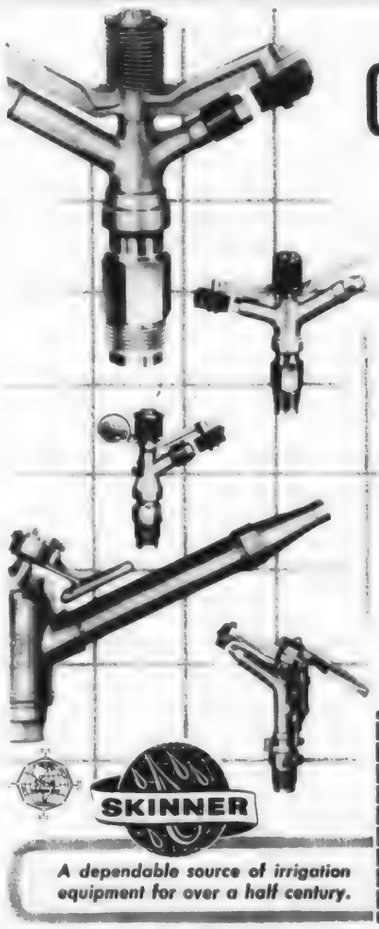

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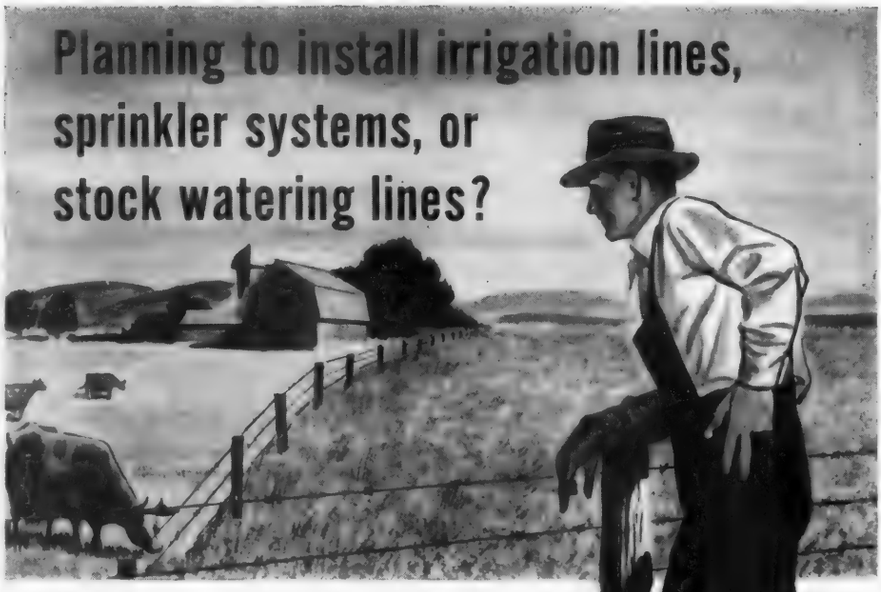

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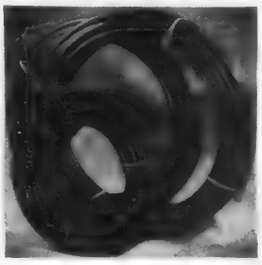

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS NATIONAL **Polyethylene** PIPE

UNITED STATES STEEL

ties of strawberry and soft and spotted tomatoes grown in puddled soil. Normally, good drainage will take care of this—though frost plays strange tricks with drainage, too. Sometimes frost will actually improve the ability of a soil to absorb water while at other times it seems to seal off penetration.

In spite of these problems, the men who are using sprinkler irrigation for frost control are sold on it. When a group of 34 farmers who used frost control irrigation on a wide variety of crops were asked if it were worthwhile, all of them answered that they wouldn't be without an irrigation system. Over half of them said flatly that their systems had paid for themselves for frost protection alone, even if they had never been used for their normal purpose of providing water when the crops need it.

Frank Deaner is one of these enthusiasts and for good reason. "One year," he said, "I only had enough irrigation equipment to water half of my berries during frost. I picked five hundred crates per acre from the irrigated land and seventy-five crates from the unirrigated—enough of a difference to have paid for the system and then some. And last spring when I told Bob Palmer that I'd paid for the system in five minutes, I wasn't just kidding. I picked between four and five hundred crates from each acre of that land and farmers that didn't protect against frost were getting as few as four crates."

QUIZ ON ANTIBIOTICS

(*Continued from page* 47)

derables. The current theory is that the viruses seem to make themselves so completely at home in the cells which they attack that the antibiotics cannot destroy them without damaging the cells, too.

Q. Are there any rules of thumb by which one can distinguish between the various antibiotics so that he will know which to use in a particular case?

A. For the layman the answer is no. This would be almost like expecting a sick man to prescribe for himself. In the first place, without training it is usually quite risky to try to diagnose a condition. Then, even were the diagnosis correct, only the individual who has been trained to read and evaluate reports of the latest developments in the fields of medicine and nutrition is equipped to say which drug to administer and in what dosage.

This is not to suggest, however, that the farmer is helpless in selecting a drug or growth stimulant for his livestock. There are scores of proprietary medicines on the market containing antibiotics. Each of these is offered to the public with a list of the maladies for which it is a specific and with instructions for its dosage. The same is true of the various antibiotic premixes sold for use in feeds. The im-

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Pictured is Mr. Kenneth Dennehy of General Irrigation Co., Warehouse Point, Conn., who sells Gorman-Rupp Irrigation Pumps.

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Yardley quality means extra years of trouble-free, cold-water service for your home, milk house, barn; for livestock, poultry, garden. Ends drudgery of carrying water.

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portant point is to be certain of the diagnosis and use care in administering the drug. In other words, be sure of your target and use the proper ammunition. In all cases of doubt—and these occur more often than not—consult your veterinarian or one of the nutritionists on the staff of your state agricultural college.

It would be wise for all farmers to consider the concluding paragraph in "Antibiotic Therapy," an authoritative work by Welch and Lewis. "Properly used," they say in speaking of human therapy, "these drugs are life saving, perhaps more so than any other agents available to the clinician. Improperly used they can be dangerous drugs . . . Injudicious and indiscriminate use of the antibiotics can lead to serious difficulties. It is fortunate indeed that these are prescription drugs to be administered under the supervision of a physician."

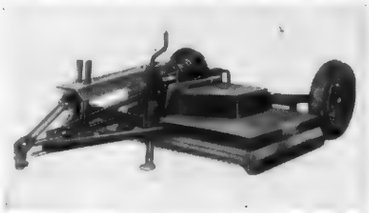
Antibiotics in Feed

Q. You mentioned the use of antibiotics in feeds. There seems to be no doubt among farmers and research workers that antibiotics are a powerful tool in promoting growth and making for more efficient feed production. How do they do this?

A. Don't we wish we knew? Actually, this is another one of those questions for which there is still no definite answer. Again, there are various theories.

One of the most commonly accepted of these theories is that since a healthy animal grows faster than an ailing or "unthrifty" animal, the antibiotics do their work by controlling the growth of disease

"I WOULDN'T TAKE $1,000.00 FOR IT



. . . if I couldn't get another." That's how Earnest Grimes of Waynesburg, Pennsylvania feels about his Wood's Model 80 Rotary Mower-Shredder. He says, "Never saw anything equal it in cutting brush – cut Locust, Hickory and wild cherry 3½" in diameter – walks right through it. Use it for stalk shredding, too." Wood's PTO-operated Rotaries mow, shred and mulch anywhere at lower cost, at higher speeds and with less maintenance than by other methods.

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bacteria. The veterinarian calls this "controlling subclinical infections." Disease bacteria are always lurking in all animals. As long as the animal is in good condition it is able to combat them successfully; but once it is subjected to fatigue, dampness, unsanitary quarters, or other stresses, the disease organisms are able to get in their licks and the animal succumbs to sickness. Those who accept this theory maintain that the antibiotics so control and weaken the pathogens (the disease-causing microorganisms) that the animal receiving them is enabled to use more of its food intake for growth. The energy formerly needed by the animal to build up its defense against the disease germs is now released for growth.

One factor which seems to support this theory is that under germ-free laboratory conditions the effect of antibiotics in promoting growth and feed efficiency is nil; but under farm conditions low level feeding of antibiotics gives up to 15 per cent better weight gains and up to 20 per cent better feed efficiency.

Another theory is that there are in the digestive tracts of the animal many bacteria which utilize many of the vitamins which the animal needs; the antibiotics check the activity of these bacteria and the animal thrives on these vitamins of which it was formerly deprived. It has been suggested, too, that the antibiotics actually stimulate the production of needed nutrients by the intestinal bacteria.

Still another theory, based upon experimental studies, is that the antibiotics seem to reduce the thickness of the intestinal walls, thus enabling the body to absorb nutrients more efficiently.

Q. Your mention of the theory that the antibiotics work on the bacteria in the digestive tracts of the animal recalls a little personal observation. I have noticed that a sow fed antibiotics at farrowing will have darker manure and will have fewer visible oats gleanings if she has been fed oats. Would that theory explain these facts?

A. Probably not. This reaction was apparently coincidental. Stock treated with high levels of antibiotics will sometimes have a light colored manure but the reaction is not entirely consistent.

Q. I have seen claims that the antibiotics stimulate appetite in sick animals and promote the growth of friendly bacteria. Explain this.

A. This is probably an indirect action. The inhibiting or destructive effect exerted against the pathogens give the friendly bacteria a much greater opportunity to propagate; and since animals which are in good condition always eat more than sick animals those which have been protected from secondary infections by antibiotics will generally have a good appetite.

Q. Is there any advantage in using antibiotics in combinations?

A. Apparently so in the treatment of

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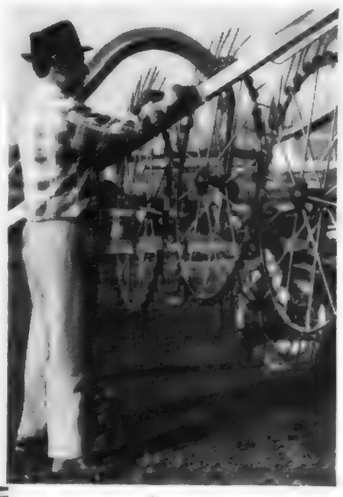

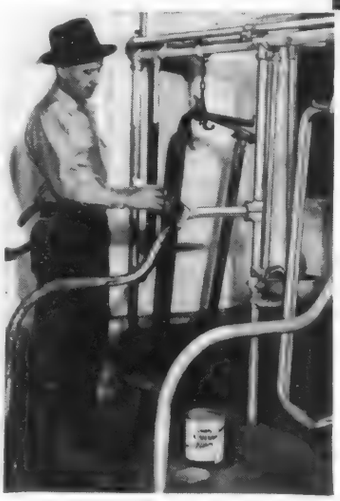

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disease. Most of the leading pharmaceutical houses are now manufacturing preparations containing a number of different antibiotics. One of the latest weapons against mastitis is a combination of five different antibiotics. Critics of this technique refer to it as "shotgun therapy."

Q. Do antibiotics cause allergic reactions in animals as they do in humans?

A. Veterinarians have found that some animals are very definitely allergic to the antibiotics. This has been true particularly of small animals, cats and dogs which are frequently given almost the same careful attention when they are sick as their masters. The sensitivity of commercial livestock to the antibiotics has not been so definitely established since they are not ordinarily subjected to the same close observation.

Q. Might these allergies prove serious?

A. Yes, they could. According to Dr. Joseph G. Graca of the Iowa State College Division of Veterinary Medicine, once an animal has been made allergic by the previous use of an antibiotic, serious damage, in the extreme case even death, might result from subsequent administration of the drug.

Q. Has it been found that any of the disease causing microorganisms build up an acquired resistance to the antibiotics?

A. Yes, some organisms very quickly build up an acquired resistance to penicillin and streptomycin, for example. So far, resistance to the broad spectrum antibiotics seems to develop more slowly.

Q. Is there any danger that animals which are given antibiotics in their feed might build a tolerance to them which would make them more or less immune to the antibiotics should the need arise for giving them in larger doses for the treatment of disease?

A. There is such a possibility. Research workers hope that they can overcome this tendency by the use of combinations of antibiotics and other drugs.

To counteract this possibility one authority on swine nutrition has suggested that the hog raiser follow one of these three plans: (a) feed combinations of antibiotics; or (b) change the antibiotic in the feed every three months; or (c) feed one antibiotic to breeding stock, another to baby pigs and a third to fattening hogs.

Q. Aside from any allergies which might be caused by the administration of an antibiotic is there danger of giving an overdose when the antibiotic is given in the feed?

A. No. Such danger is very slight unless the antibiotics are administered at extremely high levels. Antibiotics, like vitamins, can be tolerated by the body in greatly excessive amounts.

Antibiotics for Ruminants

Q. I have heard that antibiotics are of little or no value and, as a matter of fact, might be of negative value as growth stimulants in feeds for ruminants because they may attack the rumen bacteria. Is this true?

A. No. Excellent results have been obtained in feeding antibiotics to cattle and sheep. The danger of over-eating disease (enterotoxemia) among feeder lambs has been reduced almost to zero through the use of aureomycin and terramycin.

Q. Stilbestrol has been pretty generally accepted as a valuable aid in improving the efficiency of beef feeding. Can stilbestrol and antibiotics be used together?

A. It would appear that they can be used together and that the antibiotic may help the stilbestrol under some conditions, particularly when the cattle are on a high roughage ration. Dr W. M. Beeson, of Purdue, recently cited the result of experiments from various parts of the country which showed that steers fed stilbestrol alone increased their growth rate 9 per cent and their feed efficiency 7 per cent over control groups. But steers fed terramycin and stilbestrol increased their growth rate 18 per cent and their feed efficiency 12 per cent.

Q. What is the difference between low level and high level feeding of antibiotics?

A. Low level feeding is usually at the rate of 10 to 25 grams of antibiotic per ton of feed. In terms of body weight this is about

Water is lifted over a 60 foot wooded rise through 430 feet of main line.

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LOCATED in the downtown area of Montgomery, Alabama, is the J. B. Sylvest Seed Company. Mr. Sylvest, the owner, takes unusual pride in his work and this is reflected in the quality seed which he distributes. One of his big ambitions was to offer his customers a vintage seed corn. For years the weather interfered. There was always a shortage of rain during the June 15 to August 1 critical growing period. This year sprinkler irrigation answered his problem. Looking at the corn in late August, a friend of his who has been farming corn for 58 years said, "This is the best crop of corn I have ever seen anywhere in the country." Yields averaged over 70 bushels per acre from 180 acres planted with Cokers 811 parent seed corn. This represented a 50% higher yield than that obtained on adjoining non-irrigated farms. Beyond this, Mr. Sylvest was also able to obtain 80% flat saleable grains instead of the usual 65 to 70%.

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J. B. Sylvest's system was engineered by the Alabama Irrigation Sales & Service Company located in Birmingham, Alabama. The two Marlow Model 6E6S pumps are powered by GM-43400 diesels. One of these pumps lifts the water from a stream and pushes it over a 60 foot bank. After discharging into a ditch, the water runs ¾ mile. Another Marlow pump then picks up the water and discharges through the irrigation system at a pressure of 60 pounds per square inch. This pressure is sufficient to operate 56 twenty-two gallon sprinklers through 1330 feet of 8-inch and 6-inch main and 4200 feet of 4-inch laterals. Four laterals, 14 sprinklers each, are operated at one time with another lateral remaining "dead" for moving. Mr. Sylvest claims that the pumps operate beyond his expectations and run at "little more than an idle" to deliver all of the water he needs. This allows for further expansion later without overloading or overspeeding the pumps.

At an operating cost of only three gallons of diesel fuel per pump, per hour, this system has been a lifesaver. A record crop of seed corn, with a $3000 additional profit, was harvested. Without the system, the crop would have been poor with only three inches of rain during the critical period. Now, Mr. Sylvest can grow a record crop of corn every year.

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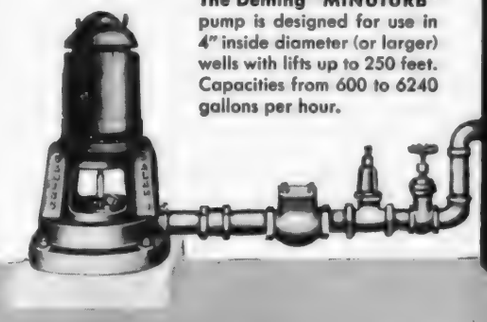

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1/10 milligram of antibiotic per pound of body weight for cattle and sheep; up to 1 milligram per pound of body weight for swine.

High level feeding is at the rate of 50 to 200 grams per ton of feed.

Q. When is high level feeding recommended?

A. It is generally recommended when the stock show signs of disease, for "tail-end" and runt pigs, when stress can be anticipated, or when exposure to disease is expected to be great. For example, when hurricane warnings are posted in the Del-Mar-Va region poultrymen there might save themselves considerable loss if they anticipated this stress with high level feeding.

Q. What does it cost to feed antibiotics?

A. Feeding cattle at the rate of 80 milligrams per head per day with one of the more popular antibiotics would cost 72 cents per head for 100 days, $1.44 for 200 days.

It would take about 2.6 grams of this same antibiotic to carry a hog for the 14 weeks it would take him to grow from 40 to 200 pounds. This would cost 23 cents.

Used in a chick starter for two to three weeks, this same antibiotic fed at 100 grams per ton of feed would cost $2.83 to $3.78 per 1000 birds. Fed in the broiler diet during periods of stress it would cost $1.80 to $3.15 per 1000 birds.

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For Crops, Too

Q. We have confined our discussion so far to antibiotics and their relation to animal health and nutrition. Are they being applied to crops in any way?

A. Yes, but because of high costs their present use is confined to crops of high per acre value or where control can be achieved through the use of small quantities of spray materials, as on seedbeds.

Q. How do antibiotics benefit crop production?

A. Through disease control and stimulation of plant growth.

Q. What are the advantages of antibiotics over conventional sprays used to combat plant disease?

A. Unlike copper, sulphur, mercury and others which protect plants only at the surface, antibiotics enter the plant tissues and apparently destroy the harmful microorganisms within the plant without damaging the plant tissues.

Q. How do antibiotics boost plant growth?

A. Just as with livestock, the scientists still are not certain. They think the answer may lie, to some extent, in the soil. The soil may contain significant amounts of inhibitory substances of microbial origin which even in low concentrations injure the chloroplasts of seedlings. In more mature plants the antibiotics apparently bring about a favorable shift in the microflora.

Q. Has there been any large scale use of antibiotics to promote plant growth?

A. Not yet. The process is still too costly and time-consuming for the farmer.

Q. Have antibiotics proven more practical in the fight against plant diseases?

A. Yes, definitely; here they have really proven their worth. They are being used successfully to control fireblight of apples, bacterial spot in peach trees, walnut blight, halo blight of beans, bacterial spot of tomatoes and peppers; onion mildew; wildfire and blue mold of tobacco and pepper; bacterial blight of celery, cherry leaf spot, black leg and seed-piece decay of potatoes and a score of other diseases.

Q. What are some of the antibiotic preparations now on the market for plant use?

A. Agri-mycin 100, Agri-Strep, Phytomycin, Acco Streptomycin and Acti-dione.

Q. Has any attempt been made to use antibiotics for the control of wheat rust?

A. Yes, Acti-dione in concentrations of 50 to 500 parts per million has been found to be quite effective against wheat rust.

Q. Are antibiotics effective for all crops and plants?

A. Unfortunately, no.

Q. How do antibiotics seem to move in the plants?

A. All present antibiotics move in an upward direction. Scientists are now looking for types which will move downward and into the roots to control root rot parasites.

Q. What are some of the more pressing problems in connection with antibiotics and their application to crops?

A. First, the need for antibiotics which will travel downward and into the roots of plants. Second, an antibiotic with a wide anti-fungal spectrum—one which will attack a wider range of diseases caused by fungi. Third, an antibiotic effective against viruses of stone fruit. And finally, cheaper manufacturing methods so the average grower will be able to use the drugs.

Q. We have heard talk recently of the use of antibiotics in food preservation. What is their role here?

A. Much of the spoilage of food is caused by the growth of contaminating bacteria which go to work on any organism as soon as the life processes cease. If the growth of these bacteria can be inhibited much of the spoilage can be checked. This is where antibiotics enter the picture. They can be used to inhibit the growth of the contaminating bacteria. Aureomycin is the antibiotic presently used most widely in food preservation. Biostat is another which has recently entered the field. Using these drugs, poultry, which ordinarily could be kept no more than a week if stored in refrigeration after killing, can now be kept fresh for two to three weeks. After killing, the birds are immersed in a tank of iced water containing 10 parts per million of aureomycin.

The residue of antibiotic left on the meat after the poultry is removed from the tank is sufficient to inhibit the growth of contaminating bacteria for 14 to 21 days if the poultry is stored in refrigeration.

The properties for using antibiotics in the preservation of red meats and fish is equally promising though it is not yet in use commercially.

Q. Can you give us an inkling as to the future of antibiotics in agriculture?

A. Only so far as to say that this is only the beginning. The wheels are turning so rapidly in this field that it is safe to say that within the next decade our present antibiotics will probably be as obsolete as the Model T. One of the major goals of the research people is to find an antibiotic which will be effective against viruses. If they continue in the spirit of their predecessors the odds are they will probably reach that goal.

Q. Could you suggest any means of helping to give the American farmer a better understanding of antibiotics and their potentialities?

A. Yes. In the fall of 1955 there was held at Washington, D. C., the First International Conference on the Use of Antibiotics in Agriculture; and last January there was a National Symposium on Medicated Feeds. These were milestones in the dissemination of information on antibiotics and their relation to agriculture. But they were meetings at which scientists talked to one another in their own esoteric jargon. It would seem that there would be tremendous value in the inauguration of a series of state or regional meetings attended by both farmers and scientists—men from the pharmaceutical industry as well as from the experiment stations—where the discussions would be in somewhat less formal language and where the farmers would have the opportunity to get the answers to many of their problems. Such conferences would seem to be almost essential if the farmer is to use these new drugs to the best advantage.

ELMER AND THE WINTER WOODPILE

(*Continued from page* 51)

hardness of the wood and spilling it in foamy cataracts. We, too, breathe easily again, and listen, in our subconscious, to the saw's restored droning, to its hum.

With his countrywise counsel Elmer has saved me no end of trouble. But I must always ask for his advice. Unless you ask, he will let you make a fool of yourself and say nothing. He will let you dig a springline up a rocky hillside to a spring he knows will run out the first dry spell. And when you ask him why he didn't warn you, he'll say, "You didn't ast me."

Even when you ask, Elmer presumes not to instruct you. "If it were mine, I'd do thus and so." Or he will direct your attention to the ways of nature, or to providence, or to the Lord Himself, as when I asked him whether I should seed my lawn in the fall or in the spring. Elmer thought a moment and then replied, "Well, now, when does the good Lord do His seedin'?"

"In the fall, isn't is?"

"Well, He ain't no fool."

We roll another log on the skids. This one's a giant. I feel as though we've laid the ghosts of six generations of Green Mountaineers, men who knew this great tree, knew whether it was "thrifty" with its sap, knew the color its leaves turned in the fall. It has fallen to my lot to cremate this giant of the sugar lot. Its ashes will go into the garden, back into the soil.

Elmer squats down to examine the trunk. The age of the tree can be read in the concentric rings, but what interests Elmer is a dark configuration resembling a cogwheel ingrained in the heart of the tree.

"Been tapped too hard," says Elmer.

"You mean too deep?"

"No, too close, too often."

The flesh of the trunk is gnarled and twisted, and the saw complains. Its teeth grind slowly; the sawdust comes out spar-

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ingly, mere snow-spitting in the air. Elmer inserts three wedges as soon as the cut will take them. They are like a crown on the log. He taps the wedges gently with the sledge, alternating the strokes because the wedges have a tendency to bounce up. Only by skillful strokes does he manage to sink them deeper into the crack. And then the saw begins to breeze more freely.

"The wood's too nervey," says Elmer to describe the seams, sinews and tendons through which we are sawing. His speech breathes of the days when these forested hillsides were mowings and pastures and dotted with farm dwellings which are now mere cellar holes overgrown with birches.

Every minute or so Elmer drives the wedges a wee bit deeper. They are not the regulation saw-wedges loggers use. They are home-made, smithed out of old worn out saw-blades. All of Elmer's tools—saw-wedges, saw-sets, gauges, axe-helves, snaths, the wooden clamp on which he mounts the saw to file it—are of ancient vintage, heired from his grandfather. "Do just as well," says Elmer, "no usen spendin' money for boughten ones."

Elmer is a living link of life as it was lived up here a hundred years ago. Tractors roar up and down the countryside; bulldozers uproot trees and level off mounds, changing the contour of the old familiar landscape; monstrous balers clatter over mowings and scoop up windrows with incredible speed, flicking the hay out in concentrated packages. Chain saws drone in the woods with the noise of airplane propellers; red oil trucks pull up into backyards and in a matter of minutes pump a month's heat into a drum buried in the earth.

In the midst of it all, with calm imperviousness, and enviable serenity, Elmer lives the old life, a life of absolute self-reliance and self-dependence. His chores, his heating and cooking arrangements, his water supply, the entire pattern of his life, or any part of it, cannot be disrupted by a dead sparkplug, a dead battery, by blown-out fuses or transformers or condensers, by frozen pipes, by the tyranny of dripping faucets or the erraticism of flush toilets, or the whims of plumbers, mechanics, electricians. Elmer has never surrendered, even partially, reliance on his own ingenuity and ability to handle matters in his own individualistic way. He has never given up the humanly possible for the mechanically and electrodynamically uncertain.

Frugality is ingrained in Elmer. He wastes nothing, least of all the movements of his body. He is sparing with his gestures, sparing with the twitching of his face muscles. When he laughs only his throat laughs. His face and eyes never smile. The strokes of his axe are clean and precise, the bit striking where it's meant to. He draws the saw in his direction just so much and no more, and then

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Bostrom-Brady Manufacturing Co.
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see page 133 for
XMAS GIFT SUGGESTIONS FOR GOOD FARMERS

PAW-PAW TREES 98¢ ea.
Produces large tasty yellow fruit that has a distinctive banana flavor. Beautiful—with large purple flowers, dark green foliage. Sturdy 18 to 24 in. trees, adapted to northern planting. Reach 20 ft. at maturity. Catalog *free!* Postpaid 3 for $2.89

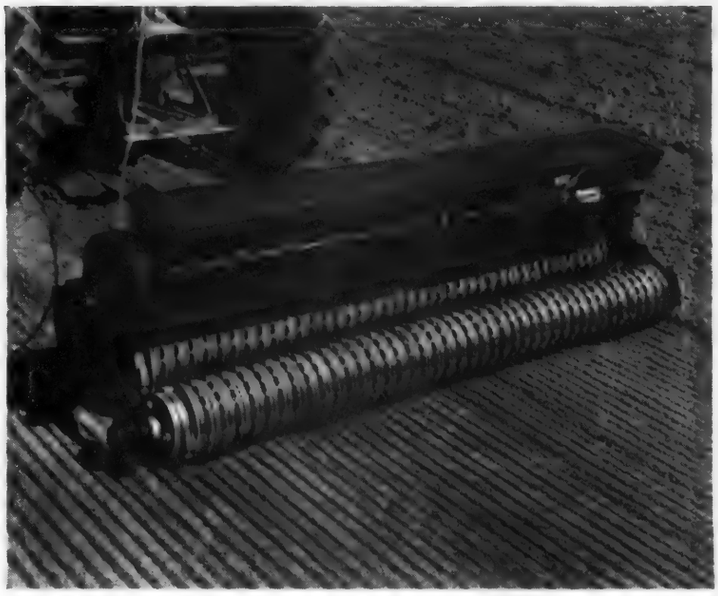
CREEPING PHLOX *In Red, Pink, Blue, White* 4 FOR $1 POST PAID
This unusual plant will make your garden a showplace. Moss-like evergreen foliage completely covered with flowers in exquisite colors. Grows on poorest soil. Send $1 for special introductory offer: one each of all 4 colors. Latest color catalog FREE.

GLORIOUS NEW NOVELTY
GOLDEN RAIN TREES $1.39 Each Postpaid 2 for $2.48
Rich-looking long yellow flowers on this unusual tree look like gently falling rain. A rare delight when in full bloom. Hardy stock, easy to grow. 18 to 24 in. trees will grow to full height. Color catalog included FREE. Order TODAY!

HARDY MAGNOLIA *Soulangeana* $1.98 Postpaid
Sturdy, 2 to 3-ft. trees—regularly $2.75. (No C. O. D.'s).
Full line of Trees, Shrubs, Evergreens, Roses, Perennials, etc. CATALOG FREE. Write today!

THE WHITTEN NURSERIES
BOX 100 BRIDGMAN, MICHIGAN

WHY BRILLION'S LIFE-LINE SEEDING



gets a catch when others fail

Brillion Life-Line Seeding gets a sure, uniform stand — even when other seeders fail — because every seed has a chance to grow.

Only Brillion Sure-Stand Seeders lay every seed in the "Life-Line" — the top ½ inch of soil. Rollers of special design cover the seed, gently firm it into a clod-free seedbed for high germination, and sure, uniform stands.

This exclusive Life-Line Seeding and firming . . . plus Brillion's accurate seed-saving Seedmeter, cuts your seed bill by up to 50%.

See the Sure-Stand Seeders at your Brillion dealer's. Select the size and model to fit your exact farming needs.

IF BRILLION MAKES IT, IT *MUST* BE GOOD

Clip and mail to Brillion Iron Works, Inc., Dept. SG-3-12, Brillion, Wisconsin

Send me complete information on the Brillion Implements I have checked below:

☐ Sure-Stand Seeders ☐ Rotary Hoes ☐ Rotary Shredders ☐ I am a student

Write your name and address on the margin.

Brillion®

SURE-STAND® GRASS SEEDERS

5', 8' and 10' models.

lets it breeze your way. When he walks, there's no swaying or wobbling, only the feet and the legs move; the trunk of the body seems to be wheeled along, with the arms outspread and the elbows stuck out as if he were forever ready to tackle someone in a wrestling bout.

Each succeeding morning, as we near the end of our wood sawing, the air gets chillier. The frosty grass crackles underfoot, and the insect world is benumbed. But as the sun swims out from behind the spruce-crested ridge and throws its diaphanous mantle about us, we can hear the rustle of the earth as it stirs from its shallow lethargy. Bees and wasps begin to drone in the air, and to dart toward the house, where they hover and drum against the windowpanes, searching for cracks to crawl into winter quarters. The drumming sound of a partridge comes from the sugar lot; the sharp, reedy call of a bluejay flying abovehead has the sound of winter in it, as have the querulous, witch-like imprecations of a flock of crows chasing a henhawk above the pasture.

Let it come. The huge pile of bucked up hard wood drying in the sun is a comforting sight. There's reassurance in every block. I can feel the hardness and substance of the wood, the concentration of heat in it, the warmth against the stubborness of a Vermont winter. When you saw wood year after year, the way Elmer

Sprinkler irrigation system on the Wilson farm, Lexington, Nebraska. Continental Red Seal Model M-363 operating on natural gas drives the deep well pump.

NO PLACE FOR A JACK OF ALL TRADES

Irrigation Pumping Demands an Irrigation Engine . . . a CONTINENTAL RED SEAL Designed and Built for the Job

There's a big difference between rolling a car over a smooth highway, with frequent rests and plenty of coasting, and dragging a heavy stream of water up from the depths of the earth, hour after hour, day after day, and week after week. That's why it pays, when laying out your irrigation program, to choose power engineered and built for the really tough jobs. Not only do you save in maintenance costs by choosing the right engine in the first place; you also clinch the advantage of having water where and when you need it, all season long . . . and this may make all the difference between black ink and red. Continental Red Seal irrigation power is the product of engine experience dating from 1902. It is available for use on all standard fuels, including Diesel oil and LPG, and it's backed by service and genuine Red Seal parts from coast to coast.

Continental Motors Corporation

MUSKEGON, MICHIGAN

CONTINENTAL MOTORS · Powerful Power the Nation's · AMERICA'S STANDARD

and I do, and burn it to cook with and to warm your house, you become familiar with the temperaments, characteristics, and qualities of different woods. You come to know them by grain and bark, by their degree of hardness, by the way they burn and saw and split, and the scents they give forth as they burn. You come to feel about woods as you do about people, and you treat them accordingly. You do not have the respect for the hard-splitting, quick-burning yellow-birch that you have for the clean-splitting, longer-lasting maple. Still you are indulgent with yellow-birch because it is a generous, friendly wood; it will burn for you green when you are all out of dry wood. As for beech, it is good, clean wood, saws well, splits neatly, and burns brightly when dry. But there's something prosaic, plebeian about beech. It lacks the high nobility of maple and oak, or the impulsiveness of yellow-birch.

"Well," says Elmer as the last block topples off, "you've got wood enough to burn." He takes a long, slow pull on his old pipe and blows a cloud of smoke into the brisk autumn air. The smoke smells more like sawdust than tobacco—that would be Elmer.

THE AUTHOR: Stoyan Christowe has run the gamut of literary production—books, "This Is My Country," etc., fiction, foreign newspaper reporting, reviews, book reviews and articles. During War II he was with Military Intelligence. Lives on a Vermont farm, likes to saw wood and raise vegetables. Who's Who does not list his most remarkable accomplishment—he recently completed with his own hands the interior finish in his new home.

RUMINATING IN A BARREL

(*Continued from page* 49)

and who, until this year, had no funds for helpers. Then, because the experimental farm is right in the middle of Columbia, Missouri, they have run into such problems as finding kids playing rodeo with their fistulated sheep and pulling the plug out of Shorty. They also caught a pig stealer trying to get through the fence with one of their test animals and another feeding trial was disrupted when someone with a kind heart but no scientific spirit turned the pigs out to pasture where they would be happier. This year, the U.S.D.A. has granted them $30,000 to be spread over three and a half years of experimentation. This grant has made it possible to put a bacteriologist, E. J. Carroll, on the project full time.

Even though their work has had to be carried on between classes and after hours, their artificial rumens have been kept bubbling, producing the sour-smelling mash for their pigs and chickens. Once they tried feeding the stuff to a sheep, but he backed angrily away from it. He probably concluded that one rumen was enough for any beast. And they ran into the same problem with the editor of a scientific journal who rejected their first paper on the subject with the comment, "No pig would eat this stuff."

With all of their problems, they have come up with some strange findings. Good pig and chicken feeds, they have found, are not improved by fermenting. Quite the contrary. When chickens were fed on a good ration that had been fermented, they gained 121 grams while their test-mates on the same ration without fermentation gained 260. "We have come to the conclusion," Dr. Pfander said, "that the rumen bacteria won't work on urea if there is plenty of good protein for them to eat—like the rest of us, they get lazy. On the other hand, we find that if we don't feed them a little protein along with some quickly available carbohydrate like molasses, they seem to take no interest in the urea. It's like the Missouri mule skinner who was asked to train a balky mule. He picked up a two-by-four, walked over and walloped the mule squarely between the ears. When the owner protested, he said, 'When you're training a mule, the first thing you gotta do is catch his attention.' We figure that a little protein catches the attention of the bacteria and starts them on the way.

"From the practical point of view, the urea would only be used when the cost of this nitrogenous material was cheaper

Day in and day out

The most useful machine on the farm

By Joe Clay

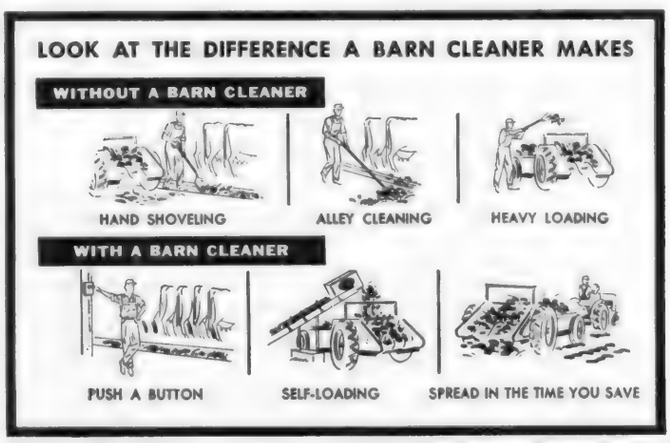
Wouldn't you say a machine was useful if it helped you feed cows—milk—put up silage—spread manure and tend to other chores? Outside of cleaning your barn in jig-time, those are some of the jobs a modern, mechanical barn cleaner can help you do—*by giving you the extra time you need for chores*—up to two hours *extra time* every day of the year.

Hand cleaning your barn can take two hours a day . . . strain your back . . . cost you your temper and possibly your hired man. Install a mechanical barn cleaner and you can remove a day's accumulation of manure from 50 cows by pushing a button. You'll eliminate the *need* for a hired man . . . maybe save your health, too, when the doctor says, "Slow down."

Any size farm can profit from a barn cleaner . . . from 12 to 100 or more cows. The price is right, too . . . as little as $600 can put an efficient barn cleaner in your plans. Low-cost cable type cleaners or big, heavy-duty installations . . . there's a barn cleaner to make dairying easier, save time and help you profit more.

But be sure to plan it right. Proper planning before you install can make a good barn cleaner even better. You can rig it to empty right into your spreader . . . if you plan. You can eliminate smelly manure pits and the bother of hauling and pitching manure . . . if you plan for it.

To help you plan your addition of a time-saving, work-saving barn cleaner, I have prepared a barn cleaner fact book. It's yours for the asking. I'll be glad to send you a list of Clay Barn Cleaner owners in your area, too. Visit these installations and see the various arrangements. They will help you plan better. Write for free planning book below.



SELF-LOADING SYSTEM. Elevator delivers manure to spreader. You'll spread in field and return in less time than you used to spend cleaning by hand. You'll have more time for other jobs . . . and for rest, too.

FREE FACTS ON BARN CLEANING

. . . for every farmer

The newest, most up-to-date information on Barn Cleaners is found in this new booklet by Mr. Clay. Write today for your free copy. Address, Clay Equipment Corp., 1261 Fulton St., Cedar Falls, Iowa. Books also available on Crop Driers, Silo Unloaders, Mechanical Feeding, and Milking Parlor Stalls. (Please specify books wanted when writing.)

than an available protein. Except for availability and cost, it has no particular advantage over animal or vegetable protein."

Finding that fermentation does not improve good feeds has given them their upper limit; the lower limit has been set by the ruminants. They have concluded from their work that any feed which will keep a cow or a sheep going can be converted into a ration that will keep chickens and pigs alive. A practical limit, Dr. Pfander points out, will be the cost of producing, gathering, and fermenting cellulose as compared to the cost of feeds that are available and ready for pigs and chickens.

To date, no cost figures have been run on these fermented feeds. And it is easy to see why the men who run the Department of Agriculture would show little enthusiasm for proving that these feeds will work when they are already burdened with a mountainous surplus of the very feeds that could be replaced by the fermenting process.

This problem does not bother Muhrer and Pfander—they are scientists, not economists. They realize that with our population growing at almost explosive rates, the time may soon come when their findings may result in lines of belching barrels outside the pig pen or chicken coop to keep us well fed. They are, like all scientists, building for the future need before the need pinches us.

They are also aware that America is an island of well-fed people in a sea of hunger. Their discovery could be used today to feed the hungry millions of India and Africa and the rest of the world. Plants for fixing nitrogen and for converting it into urea are expensive, but they *are* being built in many of the countries to produce fertilizers.

While the aim of this project has not been to produce a food for human consumption, they, like all of us, are aware that during times of famine, men have filled their bellies with anything edible, and even such inedibles as dirt, in order to quiet the pains of hunger. This fermented animal feel would support human life, but it would not taste good.

As a human food, Dr. Pfander comments, "The palatability factor would be almost impossible—the smell coming from the barrel is not the most appetizing one that could be found. I'm afraid that many humans would have a little difficulty in believing that the pre-digested material was coming from as high a point in the digestive tract as the stomach."

TAILOR-MADE MILKING PARLORS

(*Continued from page* 70)

for the incoming cow to go but into the stall. A reverse pull on the lever shuts and locks the gate. The cow eats her grain as she is milked. Then the milker throws another lever which opens the front gate, pushing it, too, all the way to the rear wall, so the cow has no choice but to move to the exit door. A reverse tug on this lever closes this front gate, a squirt with the hose cleans the floor of the stall, if necessary, and all is ready for the next cow.

After viewing scores of other installations, Heber Ellis feels this will be the ideal arrangement for one man and a herd of up to 35 cows. While the milkers are on two cows the operator can be washing the udder of the third one and preparing her for the milking. Experience on the farm and tests at the experiment stations show that one man can milk 25 to 30 cows an hour in this fashion with only about one-half the effort needed in a stanchion barn.

Endless Variety

The Ellis milking parlor, of course, is only one of an infinite variety of arrangements used to suit the needs of the individual farmer. A man with a smaller herd might use only a two-stall installation, though he might find the cost per stall rather high considering the fact that the cost of his building would not be reduced proportionately. An alternate plan is two stalls with a "prep" stall where the incoming cow is prepared for milking.

"My DARI-KOOL Cools Milk For Only 1½¢ Per 100 Pounds!"

says MR. AL ZAIS, Boyd, Wisconsin

For the past 2 years, my 300 gallon Dari-Kool bulk milk cooler has been operating with a meter to determine its electric current consumption.

During this 2 year period we used ¾ of one KWH to cool 100 pounds of milk. At 2¢ per KWH, this amounted to only 1½¢ per 100 pounds of milk. This was done with a standard air-cooled compressor. I'm sure this cost figure would have been even lower had we used a water coil during the summer months.

My old milk house was very poorly insulated but still my Dari-Kool ice-bank cooler provided nearly all the milk house heat I needed through two Northern Wisconsin winters.

I'm sure happy I chose a Dari-Kool ice-bank milk cooler.

(signed) al Zais

DARI-KOOL
BULK MILK COOLERS

Milk may be poured or piped into the cooler
The ICE-BANK COOLER that outperforms them all!
Model shown — 200 gallon Dari-Kool
Also available in: 100, 150, 250, 300, 400, 500, 600 and 700 gallon capacities.

Milk is rapidly cooled to below 38° assuring a lower bacteria count and better milk. Dari-Kool does not damage milk by freezing because the milk is cooled with ice water. Get the facts and you'll get a guaranteed, farm-proven Dari-Kool — America's largest selling bulk milk cooler.

MAIL COUPON FOR FREE BOOK ON BULK COOLING

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1444 E. Washington Ave., Dept. 153, Madison 10, Wis.

Please send, without obligation to me, complete information about Dari-Kool Bulk Milk Coolers.

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Town.....RFD.....

County.....State.....

The larger dairies are installing parlors with up to 12 stalls either in tandem or in multiple "U" shape arrangements.

One of the more popular set-ups is the lane or in-line type of parlor where the stalls are directly behind one another, usually two on each side of a central milking alley. Such an installation is illustrated in the "U" type plan on page 68. This has the advantage of reducing the size of the milking parlor, but is subject to limitations which the dairyman should consider before making his final decision. First of all, the operator loses a certain independence of action since he is unable to release the rear cow until the one in the forward stall has been milked out and is finished eating. Another disadvantage is that in most of these installations the operator must go up steps to get into the milk room. It is usually impossible to place the milking alley on the same level with the milk room, and in going to the milk room he usually has to walk across the path of the cows as they either enter or leave the parlor. A glance at the plan on page 68 will help illustrate this situation. In this plan the cows enter the parlor by way of the two doors to the reader's right. The two cows on the lower side must then walk along the raised platform at the front of the parlor to reach the exit door and the operator must climb steps up to this platform and walk across it to enter the milk room, thereby increasing the chances of tracking dirt and manure into that inner sanctum.

A set-up of this kind will also call for a higher ceiling, particularly if a pipe-line milker is used. The pipe will have to be high enough to give sufficient clearance for man and cows over the exit platform. This means that the pipe is usually beyond convenient reach in the operator's alley. In many of these installations the milker uses a stool, a short step ladder or a board laid from one stall to the other on which he can stand to connect the hose to the milker.

Despite these minor drawbacks, the lane stalls give a real boost to milking efficiency and dairymen who are using them give them enthusiastic endorsement.

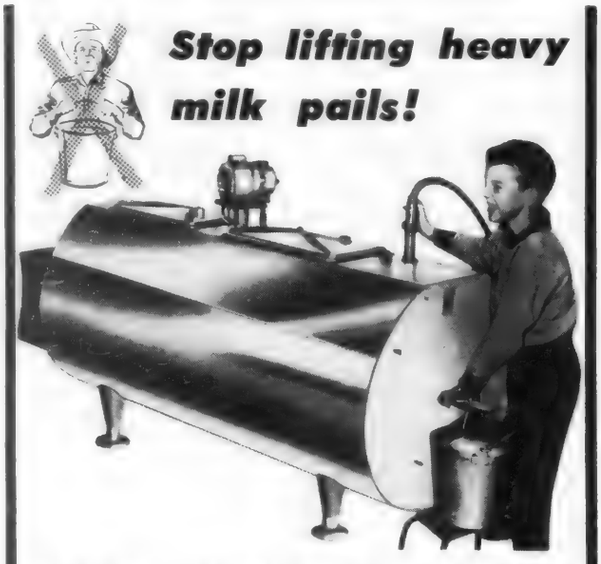
Farmers considering this type of parlor in which the cows are milked from both sides frequently ask what happens when a cow which prefers to be milked from either the right or left side gets on the wrong side of the parlor. The answer is that apparently few cows have such a rigid fixation and those that do usually manage to maneuver themselves into the right spot at milking time. One dairyman with a good many years of experience with the milking parlor says that despite the fact that his cows are herded into the holding area outside the parlor in haphazard fashion before milking, they invariably come into the stalls in almost exactly the same order every milking.

New heifers? "We don't have a bit of trouble with them," is the usual reply to this question. Most parlor users usually break their heifers by milking them by hand in the barn the first couple of times, then turn them into the stalls. "They may get a bit jubelous now and then," as one dairyman put it, "but they don't cause any more trouble than they do in stanchions."

All of which leads to the caution that whatever make of stalls one may finally decide upon they had better be well built to stand the gaff of years of handling fractious heifers, bulling cows and otherwise obstreperous cattle, and operators in a hurry to get to town on Saturday night.

The mention of stanchions also points up the fact that in many sections farmers are adapting milking parlors to use with stanchion barns. This necessitates the building of holding areas between the barn and the parlor so the operator can take a number of cows out of the stanchions, put them in the pre-milking area, release them from the parlor to the post-milking area, then return these cows to their stanchions and start a new group through the same routine.

In the colder dairy regions it is most important to provide heat in the parlor so there will be no danger of the water pipes freezing. Heat lamps placed along the wall and directed toward the pipes have been one solution. Another is to place a fan in the wall between the parlor and the milk room to blow the heat from the milk room into the parlor. A space heater hung from the ceiling will guarantee protection even in the coldest climates. Such a heater can be used with bottled gas or with electricity and will cost from $70 to $150 installed. With thermostatic control it can bring the temperature of the milking parlor up to a comfortable 65 to 68 degrees



Stop lifting heavy milk pails!

ZERO SUPER STRAINER

"Just like sucking milk through a straw"

- Completely eliminates milk pouring into tank
- Completely eliminates milk pail lifting
- Strains the milk as the vacuum lifts it into the tank
- Fits any milk pail
- Takes milk into tanks faster than 3 gravity fed strainers
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- By meter test, at least 10% saving in electricity, when using Super Strainer on Zero Vacuum Tank

You should buy a ZERO TANK because your future is in vacuum milking

Use it as a Pour-In

Super Strainer

Direct Cow-To-Tank Milking

ONLY with a vacuum tank can you milk all these ways

You can start your vacuum milking system by using your Zero Bulk Tank as a POUR-IN. Then when you get tired of lifting and pouring milk, take the next step to easier milking with a ZERO SUPER STRAINER — "Just like sucking milk through a straw." The final step in your vacuum milking system is DIRECT COW - TO - TANK MILKING UNDER VACUUM the most advanced milking method known today.

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Jersey... the breed with all the extras

Extra early maturity
Extra production efficiency
Extra adaptability
Extra ease of handling
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Extra style and beauty
Extra valuable milk

The earlier maturity of Jerseys means they are working for you sooner than other breeds. Their extra production efficiency means they will produce more milk per pound of feed or per pound of body weight.

Records indicate Jerseys have greater longevity and that they hold up better in production during hot weather. On pasture they have the "go" that harvests the grass and makes that extra profit per acre. In the barn their extra style and beauty and their greater ease of handling delight every Jersey owner.

It would pay you to look into the extra opportunities of owning registered Jerseys and producing All-Jersey Milk. Write for information today.

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Gentlemen:

Please send me additional information about registered Jerseys and All-Jersey Milk.

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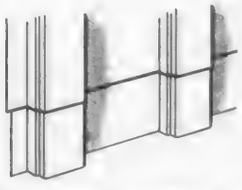
in a matter of minutes and hold it at a safe 35 to 40 the rest of the day and night.

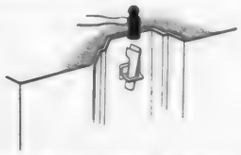
Costs

Because building costs vary from place to place and because one farmer may put the entire job in the hands of a contractor while another may do part or almost all of the work himself, it is difficult to put a price on a completed milking parlor. Contractors' bids on a three-stall parlor and milk house similar to the Ellis plan have been running from $2400 to $3600 in the Midwest. This is without equipment. The stalls cost around $170 apiece and the vacuum line, vacuum pumping outfit and two other milker units run $425.

The leading manufacturers of milking stalls and milking parlor equipment are: Babson Brothers Company, Chicago, Illinois; Clay Equipment Corporation, Cedar Falls, Iowa; The DeLaval Separator Company, Poughkeepsie, New York; Farmer Feeder Company, Inc., Cambridge City, Indiana; Girton Manufacturing Company, Millville, Pennsylvania; James Manufacturing Company, Fort Atkinson, Wisconsin; The Louden Machinery Company, Fairfield, Iowa; J. C. Marlow Milking Machine Co., Inc., Mankato, Minnesota; Universal Milking Machine Division, National Cooperatives, Inc., Albert Lea, Minnesota; Standard Equipment, Inc., Bel Air, Maryland; Starline, Inc., Harvard, Illinois.



Special interlocking corrugation provides weatherseal joints.



Patented Clip-and-Wedge assembly speeds erection, saves money. Eliminates need for screws and bolts.

Completely adaptable to all farm uses

Use individually or in combinations for barns, loafing sheds, tractor and equipment storage, etc. Erect yourself—no cutting, fitting, welding. 30' clear spans available in 10' 8" or 12' 8" eave heights; 40' and 50' spans in 14' 8" eave heights.

Write for additional details.

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UNITED STEEL FABRICATORS, INC.
WOOSTER, OHIO

Save Time–Save Labor–Save Wages

Witmer's Farm, Dalmatia, Penna., Mark M. Witmer, owner. 355 acres. 40 Pure Bred Milking Guernseys, 24,000 Alger White Rocks, 40 acres apple and peach orchard.

Russell W. Keiter, Sr., feeds orchard prunings and cuttings into Model C-5 Fitchburg Chipper at Witmer's Farm. Fitchburg Chipper has been used since 1953 with an estimated labor-saving of 40%.

More and more farm executives with dairy cattle, fruit orchards, or poultry flocks are finding that Fitchburg Farm Chippers save time, labor and wages by converting waste wood materials such as slabs or pole wood into dairy bedding, and prunings or fence row clearings into excellent poultry litter and mulch.

CHIPS FROM WASTE WOOD COST YOU NOTHING

For Dairy *Use Chips for Bedding* (See Purdue University Circular 395)

Wood chips for dairy bedding are highly absorbent and have excellent holding properties. Cows like their resiliency. Pen barns, bedded with wood chips, can be cleaned with less effort than with straw. Chips kick over and last longer than other types of bedding. Use chips just outside pen barn doors—you will find areas stay more solid and dry longer than with straw or dry hay. Charles W. Miller, Farm Manager, *Tranquillity Farm, Middlebury, Conn.*, says: "The Fitchburg Chipper Model C-9 which we purchased in 1951, is performing most satisfactorily. We use it at our sawmill mostly to chip pine slabs for stable bedding for our dairy cattle—102 cows in milk this month. We have a blower attachment so chips are blown into a sawdust pile from the mill. This furnishes bedding at a saving of about $4.00 per cord. That is a saving of almost half the cost of what we have paid for purchased sawdust or shavings for bedding. Pole wood or any hard wood can be chipped as well."

For Orchards *Use Chips for Mulch* (See USDA circular #891)

A Fitchburg Farm Chipper chips prunings and cuttings instantly, right on the spot. Leave the wood chips around the base of trees as an efficient moisture-holding mulch (one recent test showed birch chips to hold 4½ times as much moisture as their dry weight). Wood chips stay put, help prevent weed growth, discourage rodents. Labor savings are great. No sod mulch or sawdust to haul in, no prunings to haul out. No need for burning. Alfred Caggiano, Assistant Manager, *Sunny Slope Farms, Bridgeton, N. J.* says: "We have been faced with limb disposure problems on our farm for many years. After our pruning season had ended, it meant loading these limbs and branches and hauling them somewhere. Now that we are using our Fitchburg Chippers, we find that we can cover our Gaffney, S. C. and our 600 acres in Bridgeton, N. J., in half the time. Not only do we save in time and labor, but we find the chips serve as an ideal mulch. We'd be lost without our Fitchburg Chippers!"

For Poultry *Use Chips for Litter* (See N. Y. State Col. of Agric. Mimeo Bulletin A-5)

Wood chips are ideal for shallow or built up manure pack. They have excellent insulating properties, are highly absorptive, tend to reduce odors, are dust free and "scratchable". Because of their excellent durability, wood chips maintain dispersion, provide bulk and are particularly long lasting. Wood chips are excellent for use when manured for use as a soil amendment. Litter is easy to remove from poultry houses and will not clog your manure spreader.

WHY FITCHBURG IS YOUR BEST BUY

Fitchburg Farm Chippers are built for rugged farm use—to operate long hours at a time and stay out of your shop. Blades are high-chrome, high-carbon steel and should not need frequent sharpening.

Only Fitchburg Farm Chippers have the spring-activated feed plate that "gives" with the brush, pole wood, or slabs entering the chipper, protects you in case metal or other foreign materials are accidentally fed, gives equal ease in chipping all wood sizes to machine's rated capacity.

Only Fitchburg Farm Chippers give you a ONE YEAR GUARANTEE. Best of all, you can own a Fitchburg Farm Chipper for as little as $960.

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Mail the Coupon Get Free Facts

Coupon brings specifications, new color cutaway drawings on how Fitchburg Farm Chippers work in action, full information and data.

Send free Fitchburg farm data.

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Address or R.F.D._____

Town_____ State_____

(*Continued from page* 38)

substituted that instead. This slowed down our gains a little but it saved a lot of money. You see, we count on buying most of this summer finishing corn locally."

Selling for the Highest Bid

"Now, by the time October rolled around last fall we had several hundred cattle ready to sell. And the prices had come back. We were offered $26 by a Madison packing house, a little more by a Milwaukee buyer, but we had a bunch of animals in good and choice grades and it was worthwhile for us to do some research. So we made up a truckload of steers, heifers, and yearlings and sent them down to Chicago to our commission man and told him to sell them with no special explanations. This gave us a chance to see what the shrink would be, how much more we would get than in Madison, and whether the extra money would outweigh the trucking and shrink. Also, by going down to Chicago with the cattle we got a chance to see just how our animals stacked up with other stock that was being shipped in there and we could see how the buyers liked our finishing. I would say that this truckload 'market-sampling' made us about $1 per hundred weight on several hundred animals we sold later. It was worthwhile.

"Our plain cattle we sold locally at around 1100 pounds and they brought $17 to $17.25. For all the early part of

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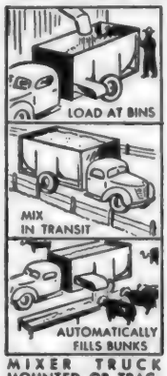

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MOLASSES, dry or liquid, silage, grain, chopped or ground hay, fodder, etc.
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the year the plain cattle were the best deal. In June all I wished was that we had a bunch of Holstein feeders—cattle we could have bought at $12 and sold at $17 right here in Madison, half an hour from the farm. Then when the price started going up in the fall, I was glad we were in the good cattle market, too. Diversification never hurts a farmer if he can make each operation big enough to be profitable in itself."

Dairying is Steady

In 1945, the Renks went into a two-farm dairy operation, taking a dive upstream when many dairymen were going into less labor-consuming activities. The two farms they bought at that time were equipped to sell Grade A milk on the Madison market, and following the idea of using the large amount of roughage the farm produces, a herd of Holsteins was a good choice.

Says Walter Renk, "Al Motl started with us then as an unmarried fellow, and he is still with us, running the dairy with one other man to help at milking time. He is married now and raising a family. He is charged out with feed from our mill, and his operation is charged with a share of the whole farm overhead. We fill his upright silos with grass and corn. He draws a salary, has a good house to live in, and the dairy is making a steady, but modest profit. We shipped over 500,000 pounds of milk last year. Our 60 cows averaged 386 pounds of butterfat on

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Big farms are not just accumulations of little farms. Margins of profit on big farms are narrow . . . big profits are made through increased volume. Little inefficiencies which a small farm can sometimes "absorb" mean loss on a big farm and a big farm can suffer big losses.

Because of your bigger investment in land, buildings and cattle, you must have all the milk your cows are capable of producing. This means you must have a tested, uniform feeding program and quality feed products backed by the kind of research which justifies your confidence.

Purina Chows, produced under laboratory control and guided by 30 years of on-the-farm research (and the experience of thousands of dairymen all over the Western Hemisphere), are designed to give your calves, heifers, dry cows and milking string the nutrients they need to build high MILK PER COW production on big farms.

Purina's feeding program, carefully laid out by experts in the field of dairy cattle nutrition, has much to offer the large-scale dairyman whose big investment justifies the most careful, efficient feeding, just as it demands good machinery, buildings, cattle, labor and management.

You can trust Purina Chows. Their uniformity, efficiency and balanced nutrition are known wherever dairying is big business.

Call your nearest Purina Dealer for details of the Purina Feeding Program for Dairy Cattle.

Do you milk or plan to milk 100 cows or more? If so, write for your copy of "TIPS for BIG Dairymen," prepared especially for absentee owners of big dairy farms.

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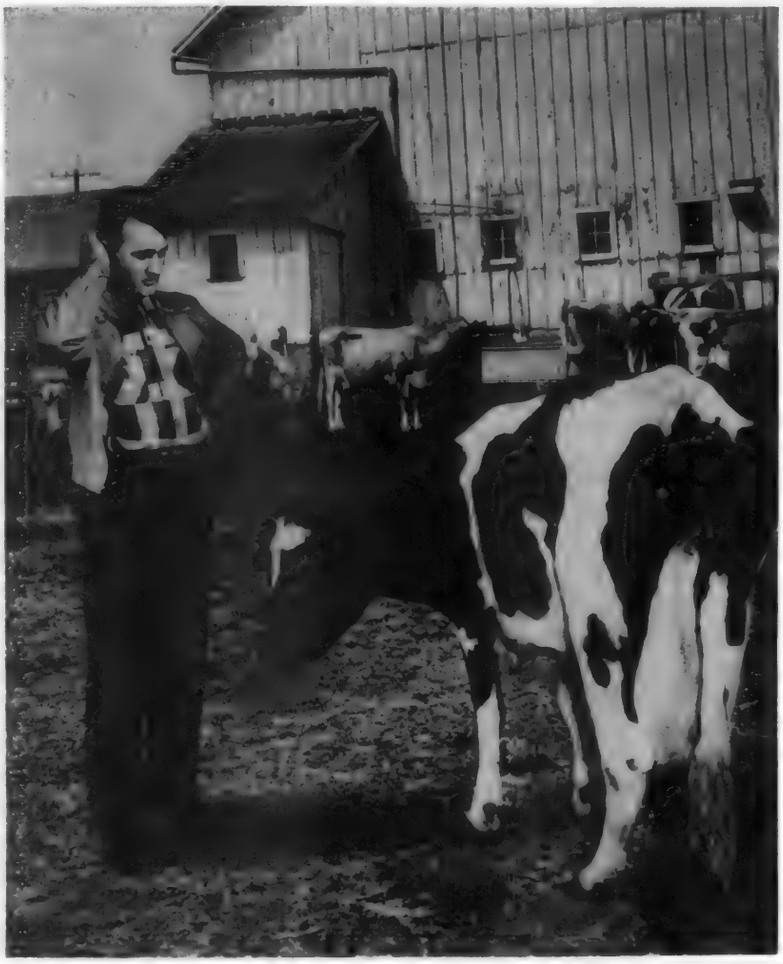
DHIA test. It's another way to spread our risk.

"We have 92 animals; we milk 42 the year 'round. We have culled and built up our herd on DHIA testing. Our aim in the near future is to go to pen-type housing and eliminate the handwork that Al does in cleaning up behind all those cows in stanchions. With our equipment and skilled tractor-handling men, we could clean out a loafing barn in half a day and save hours of hard work."



Where Hesitation Can Be Costly!

When one of your animals shows signs of illness, the first and most important step is to find out what is really wrong.

Don't guess—many diseases look too much alike. Don't try "guess-work" treatments—what could help in one case might damage another. And don't delay—it could permit a serious disease to spread through the entire herd.

The first and best step, always, is to call your *veterinarian* By scientific diagnosis he can usually pinpoint the trouble. Then he can set up the right course of treatment to help save the sick animals, and protect the rest of the herd. At his command in doing this are all the research, training, knowledge, and skill of modern veterinary medicine. These can mean so much to the health of your farm animals, and to your profits, too. Call your *veterinarian* at first signs of sickness—it's truly your best livestock insurance.

This message in the public interest is sponsored by American Foundation for Animal Health

Field Accounts

To get the Renk's field and farming story, you'll have to look up Robert Renk. He will most likely be either riding or checking one of the farm's 13 tractors or other big pieces of equipment. For example, last fall when the corn crop was yielding 150 to 175 bushels, the old picker just wouldn't do the job. "We tried out several," says Robert Renk, "and the one that worked best for us was a new two-row Oliver. Hooked behind our Oliver Diesel tractor, it could walk through the heaviest corn without jamming up.

"Our farming year begins right after we get back from the International in Chicago," says Robert. "We like to meet old friends there; it's good advertising to get in and win with some animals you raised on the pastures you've planted and cut, then fatten them on your own brand of corn. When we get home, everyone pitches in and we take soil samples from every field on the place—no exceptions. We send these samples down to the University with these facts: What was on the field last year; manure that was spread on the field during the year, and what crop goes on it next year. For fields that are going into corn, we ask for a 100 bushel prescription.

"Then all of this becomes part of our Field Accounting Sheets (see page 37). There is a master sheet for each year. This lists the 34 different fields, from 15 acres to 80 acres, each with the fertilizer recommendations—broadcast, starter, side-dress required—we get from the University, the lime requirements, the manure we have hauled, and the record of every activity and yield on each field.

"We could go through every field's history and I could show you how we have found this accounting sheet the most valuable farming guide we have in our work. Our farm bookkeeper, Alden Holten, keeps this right up-to-date. No matter what the size of the farm, a man should have this kind of information on his operation. We produce 40,000 bushels of corn, which is processed and dried. We raise 40,000 to 50,000 bushels of oats, barley, and wheat. We sell most of the corn and more and more of the small grains each year as seed. We have to know what fertility we are depositing and withdrawing from each field.

"We keep complete cost accounting records on all of our farm operations. We have found that we have cut our silage-making costs in half since we went into our 3500-ton trench silo and bulk handling machines. We make silage for $4.50 a ton now, laid in the silo. That includes general farm overhead. Farming is a low-income business and the only chance for a better income is to produce a big volume of the items you are best equipped to handle. We have to be effi-

cient in every operation. Here we have helped to build better efficiency by hiring people who have know-how and who want to know how we want to do things.

"We have 11 men and their families living on the farm the year 'round. Many of them have been here for 10 years. Henry Fruth has been here 19 years, Clarence Lukes 13 years. Good homes, good equipment, and a business-like atmosphere attract the good farmers. They don't mind the hard work if the place seems to know where it is going."

Cheaper, more efficient per unit production is the method that has to be used on the Renk Farm to increase the farm profit. For on this farm there is that almost unheard of situation, fine soil that has been built up for years, that has abundant organic matter laid on it every year with the staggering quantities of manure that are spread. There isn't much that can be done with additional plant nutrition or better soil preparation. Says William F. Renk on this subject, "I was watching the field we call the 'Marsh Field' all through the summer. The rain came at just the right time and the corn was planted thick, about 19,500, I should say. If we hadn't had the early frost on September 14, I believe it would have made 200 bushels to the acre on the whole 40 acres. It is just some small quirk of nature like that that will hold us back. Certainly seeds, fertilizer, and methods are about as good as we can get them."

The Corn Business

Wilbur Renk's special province is the production of seed corn and selling it

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Keep TEAT OPEN
Keep it MILKING
Dr. Naylor Dilators act both medically and mechanically to maintain free milk flow through the canal of hard-milking teats. They give gentle, non-irritating support to injured lining of teat canal—keep end of teat open to promote normal healing—natural milking.
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Dr. Naylor Dilators contain SULFATHIAZOLE—this built-in medication is released slowly in the teat for prolonged antiseptic action. Easy to use—just keep a Dr. Naylor Dilator in teat between milkings until teat milks free by hand. At drug and farm stores or mailed postpaid.
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4,050 sq. ft. pole barn built for only $2700!

Howard M. Call and son, Charles, owners and operators of a well-known dairy farm in Darrowville, Ohio, By using Koppers Poles like the one shown here, this father-and-son team, plus one hired helper, built a large addition to their barn in three weeks' time. And the work was done while keeping up with daily farm chores.

TODAY'S HOLSTEINS are heavier and bigger than those of some years ago. They require far more room. This fact was forcibly driven home to Howard M. Call and his son, Charles, owners and operators of a 180-acre dairy farm at Darrowville, Ohio. Their old barn, built in 1912, was "bulging at the seams."

Therefore, the Calls decided to build a 4,050 square-foot addition—a loafing barn. By using the pole-type method of construction, the father-and-son team, plus one hired helper, erected the new structure in three weeks' time. And it was built for only $2700—about one-third the cost of a conventional barn of the same size.

Koppers Poles were used exclusively for this huge addition. These poles are pressure-treated with creosote and are *thoroughly* protected against rot and termites. They are ideal for pole-type construction. For free details on pole-type farm buildings, just fill out and send in the coupon. Koppers Company, Inc., Wood Preserving Division, Pittsburgh 19, Pennsylvania.

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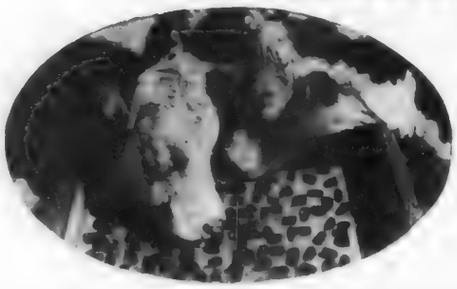

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after he has it in the bag. It's a personal job all the way through and in corn-picking time you'll find him on a stool just ahead of the sheller, checking the endless belt, with its thousands of ears of corn passing by. If he spots a bad ear, he pulls it out. Selling the corn requires sales meetings around Wisconsin and the surrounding states. Wilbur has three full-time sales supervisors working for him and 304 salesmen. "It's a selling job where you can't expand your total market," says Wilbur. "In fact, you've got the Soil Bank cutting it down. You've got to take sales volume away from someone else if you want to grow. That takes quality, service, and every kind of help you can give a customer. We like to have our customers see what we grow on our own fields around here, when the corn has manure, fertilizer, and good care. And we haven't any family secrets we wouldn't be willing to share."

John Likes Hogs

John Renk, one of Walter's sons, and the first of the fourth generation to go to work on the farm, likes pigs, which is another way of saying he knows a lot about them and understands their language. "As long as we've had cattle, we have had pigs," says John, "but they were used as a clean-up squad in the cornfield and in the feedlots, getting the good grain off the ground and out of the manure.

"Now we buy just about all of the 1500 pigs we fatten in a year about 40 miles north of here in the 'Pig Belt' of Wisconsin. There are lots of farmers up there on that sandy soil who can do a better job with little pigs than we can here. We buy them at 40 pounds. The first thing we have to do after they have been delivered by trucks is to treat them for mange. We use benzene hexachloride for that. Then we worm them; get rid of the round worms. We have found the Piperzene compounds are doing the best job of any chemical we have had. They can practically guzzle it in the feed and it doesn't hurt them. For a while people weren't getting good results with it, but then the USDA upped the quantity recommended and it does a job now.

"We like pigs that are good rustlers, especially for the cornfields in the fall—

Corn detasseling time brings several dozen high school girls and boys to do the job from the high-wheeled machines. They get paid for getting a suntan.

Berks, Hamps or the Hybrids—we want long, meat-type hogs, when they finish at 210-220 pounds for the market here in Madison. The 500 hogs we raised this summer put on an average of 1.7 pounds a day, and we were lucky not to lose a one of them. The biggest problem we have, buying pigs from all over, is bloody scours.

"In our feed formula (see page 38), we have six additives. Progen 20 is an arsenic feeding compound that keeps down the bloody scours. There is zinc sulphate to prevent paraketosis. Vigofax and vitamin B_{12} and terramycin and aueromycin make up the list. This bunch of pigs we finished in the summer in three months really went too fast for hot weather. I think we can do a more economical job if we finish them in four months.

"There is no shelter for the cows, but the pigs are smart; they find a way out of the field into the barn. So, we say they don't have shelter, but they find it. Of course, the 20 sows we farrowed during the year were given pens. Our work now is to see if we can farrow and raise, say, 1/5 of our feeder pigs as cheaply as we can buy them. To do a good job with pigs you have to live with them, and we haven't the labor to do that here. But it does give us some spread in the risk if

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* This simple new Forage Profit Plan was prepared for you. It shows why chopping is cheaper . . . how to get started. Write today and we'll mail your copy immediately.

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we have 300 or 400 pigs coming along every year. If the feeder pig market went crazy, we still could feed out our own."

Two years ago the Renks designed a feed mill to tie in with the drying and storage building. And this modern feed mill points up many of their ideas of modern farming. Housed in a grey, corrugated metal building, the inside collection of pushbutton controlled grinders, mixers, automatic weighing devices, conveyors and storage facilities will make most visitors' eyes blink. In the summer and fall seed corn and grain is brought from the field, run through the drier and fed into the big storage bins. From this point, the grain is cleaned, then packed in sacks, after being fumigated or otherwise treated, before being shipped out to customers. Broken grain, cobs and left-overs become part of the feed rations mixed daily for the cattle and hogs. In the winter and spring, when the storage space has been cleaned out by seed sales, the Renks buy corn and small grain on the local market. This is dropped down through the receiving grates and picked up by conveyors and taken to the storage building. Then to make feed out of it the belts are reversed and the corn and grain is brought out to the feed mill.

Thus, the storage and handling facilities are in constant use and the feed mill makes up fresh feed as it is needed all through the year. The mill and building cost $42,000 and practically all the guesswork is taken out of mixing by having automatic weighing switches do the power cut-off when enough of each ingredient is metered out. For large amounts of additives, a time clock device will weigh a measured amount in a predetermined number of seconds.

"Our feed mill is flexible like the rest of the operation," says Walter Renk. "We are on the lookout for new ideas and ways to cut our feeding and production costs. If we run into a high price on any of our feed ingredients then we change the formula, like we did when corn went up last summer. Then we used grass silage to carry us through to the new corn. If we find a new development like stilbestrol, we give it a try, in a small way at first. If it's good, it's put on the program. Every farmer is faced with the problem of constant rushing—to get plowing done, to get seeds planted, to get ensilage in, to get corn picked. But if he's making money today it is coming from the time he takes to get away from the rushing to stop, think and look for places where he can save a penny a pound on the beef or pork he is producing, or in making a machine do an operation that was done by hand. Any job that we can't do from a tractor seat is under suspicion.

"Say, jump in the pick-up and we'll see how long cattle feeding takes with our new wagon that mixes the grain and silage while it's rolling."

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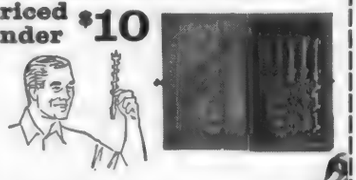

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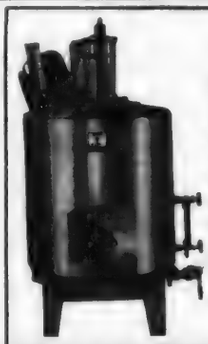

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Electrically Heated 25-35-50 gals. sizes.
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BIG FRUIT FROM SMALL TREES

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Box Q-19, Bridgman, Michigan

LIQUID FERTILIZER PLANTS

(*Continued from page* 65)

order, valves to admit water, phosphoric acid and acqueous ammonia, dumps in weighed amounts of potash and a dry nitrogen material such as urea, and starts the scrubber and impeller. Meters tell him when the correct amount of each ingredient has entered the tank and the pH meter tells him that proportions are o.k. This is a one-man operation. A batch of 1000 gallons, 10,000 pounds, or 5 tons (equal to 5 tons of dry fertilizer) can be weighed, mixed, and pumped into bulk storage tanks in less than 15 minutes. The mixing time is about seven minutes.

Here is a typical process. This one makes 1,000 pounds of 8-8-8 liquid mix.

1. First, 570 pounds of water is run into the mixing tank.

2. Next, 148 pounds of white phosphoric acid (54.4 per cent P_2O_5) is added to supply the 80 pounds of phosphate (P_2O_5).

3. Then, 33 pounds of anhydrous ammonia (82 per cent N) are added to neutralize the acid and supply 27 pounds of nitrogen. (A nitrogen liquid, aqueous ammonia, could be used here.) If the mixing tank is stainless steel, step 3 follows step 2. If the tank is not acid proof, step 2 and 3 would have to be combined.

4. Next, 119 pounds of urea (45 per cent N) is added to supply the remaining 53 pounds of nitrogen. Any neutral soluble salt of nitrogen could be used in place of the urea.

6. Finally, 130 pounds muriate of potash (62 per cent K_2O) is added to supply the 80 pounds of potash to the mixture.

This mixture is then pumped into a storage tank, directly into a bulk spreader truck or farmer's transportation tank.

The Convertor

Outside the building, but adjacent to the mixing room, is a piece of equipment which serves a dual purpose. This is the convertor, cooled by water. It is self-contained; that is, it uses the water over and over, and there is no loss except a small amount by evaporation. In the mixing operation, the convertor acts as a cooler. The hot mixture is pumped 'round and 'round in the convertor, which reduces the heat to a minimum and lessens fumes and loss of water and ammonia.

The convertor is also used to convert anhydrous ammonia into aqueous ammonia. The anhydrous ammonia arrives in a tank car and is piped into the convertor and is there mixed with water to make aqueous ammonia, which is then stored in ordinary iron tanks.

A tube and shell heat exchanger can be used instead of a convertor to do the simple job of cooling. It does not substitute for a convertor in converting anhydrous ammonia to aqueous ammonia unless a conversion tube is used. It cools a hot solution much slower than

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TWO LEGHORN STRAINS BRED FOR EGG PRODUCTION

GASSON G33 "HOT CROSS" LEGHORNS

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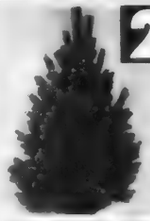

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SPECIAL STRAIN SCOTCH PINE per 1000
Very best Christmas tree strain. From seed collected by our men from selected parent trees. Healthy, sturdy, straight stemmed, rich color.
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NORWAY SPRUCE—fast growing per 1000
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BECAUSE: Hale Irrigation Pumping Units are
- Efficient; Sturdy; Dependable
- Compact and Flexible in Performance
- SOLD thru Distributors who are well qualified to Engineer a System best suited to YOUR Needs.

For MORE Work at LOWER Cost . . .

You may find the new HALE Trailer or Skid-mounted Type PIR Pump (shown above) just what you have been looking for. Other units range from the larger CIRV (1560 GPM at 75 PSI) to the FZ suitable for small acreage. The PIR will pump 500 GPM at 100 PSI; 600 at 85; and 700 at 75 PSI, recommended operating performance.

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Water Source..... No. Acres.....

HALE FIRE PUMP COMPANY
Conshohocken, Pa.

Farmer Cole makes a fresh start

THESE BEANS ARE REALLY GOOD, ANN! TASTE JUST LIKE FRESH ONES.
THEY ARE FRESH-FROM FLORIDA!...IMAGINE, OUR FARM IS COVERED WITH SNOW AND FLORIDA FARMERS ARE SHIPPING THEIR FIRST CROP OF VEGETABLES.
LATER IN FLORIDA
GLAD WE TOOK OUR VACATION IN FLORIDA, ED. IT'S BEEN GRAND! HAVE YOU THOUGHT ANY MORE ABOUT MOVING DOWN HERE?
I'M ALL FOR IT! I KNOW FARMING, FLORIDA'S GROWING, AND I'M SURE WE'LL DO ALL RIGHT.
BACK HOME 3 MONTHS LATER
I'M AT THE BANK, ANN. JUST CLOSED THE DEAL FOR THAT FARM, SO START PACKING...WE'RE HEADED FOR HAPPIER LIVING.
OH, ED, THAT'S WONDERFUL! JUST THINK, IT ALL STARTED WITH THOSE FRESH FLORIDA BEANS AND NOW WE'LL SOON BE GROWING THEM OURSELVES.

Follow the lead of Farmer Cole. Check up on the opportunities in Florida for all types of farming. Last year, Florida farm income increased 10% while U.S. average showed a decrease of 10%.

Truck farmers benefit by year 'round mild climate, ample rainfall, long growing seasons, multiple crop production, and a variety of responsive soils.

Florida also needs poultrymen, dairymen, livestock farmers and nurserymen. Experience and adequate capital are necessary, of course.

Plan a sightseeing vacation in Florida soon. Visit the farm areas. Meanwhile, mail coupon for colorful 40-page booklet "Florida Farming."

FLORIDA STATE FAIR — TAMPA
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a convertor and it uses a great deal of water, which is lost. The convertor used by Flo-lizer is made by the Carlile Engineering Company of Denver and cost $5,150. The same company makes a smaller type convertor, selling for $3,200. A similar convertor is made by the Fabricated Metals Company of California.

Another type is made by The Butler Manufacturing Co., Kansas City, Mo., and there are various "batch" methods used in converting.

Near the plant, on one side of a circular driveway, are three storage tanks, each of 5000 gallons capacity. These tanks are made of ordinary black iron, unlined (since all complete solutions are neutral) and cost $550 each. Valves and a meter for each of the three tanks are mounted on a small platform. A 1000-gallon tank truck can be driven up and loaded in 7 minutes. The tanks are kept stocked with the seasonally popular formulas so that a customer has no wait.

"Whoever heard of loading 5 tons of dry fertilizer in 7 minutes?" asks Godden. "We do it with liquid and that by simply turning a valve. This is a big argument in favor of liquid fertilizer and has been one of our biggest selling points."

Storage for phosphoric acid is in a 10,000-gallon tank near the building and siding. This tank is made of ordinary black iron with a plastic liner made by Flexiliner of Arcadia, California. The iron tank and the liner cost $1,780 ($640 for the liner). A stainless steel tank would have cost $7000 and a rubber-lined tank about $4,500. Godden and Humphrey feel the plastic liner (which can be patched like an inner tube) is satisfactory and with the guarantee on the liner, is the best way around the more durable, but more expensive, stainless steel or rubber-lined tanks.

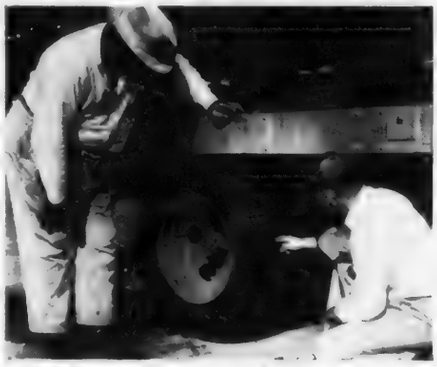
In order to quickly detect a leak in the liner, small holes have been drilled in the bottom edge of the iron tank. These are inspected often. Should a leak occur, the tank would be drained and the damage mended. Tanks with rubber or plastic liners have been in use for years without trouble.

Source of Water

Since a plentiful supply of water is a must for a liquid fertilizer plant, Humphrey and Godden had to make a decision between city water and a well. The well figured the most economical. Fortunately, the water table is near the surface in this area and a 45-foot shaft struck a good vein. The amount of mineral in the water is not important, nor is the purity of the water. The shaft is 9 feet in diameter with a 4-foot metal casing backfilled to the top. The storage capacity is 12,000 gallons. Three one-horse motor pumps have pumped 5000 gallons an hour continuously during a mixing operation without appreciably lowering the water level. The well cost $1600.

These items complete the actual plant.

B.F.Goodrich



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RALPH HARREL raises 300 to 500 head of cattle on his 3,000-acre farm near Cairo, Kansas. He uses B. F. Goodrich tires on all equipment, including 4 trucks, reports they give more mileage than any other make. All-Purpose tires on his 2-ton truck enable him to drive off the road in muddy weather without chains.

B. F. Goodrich All-Purpose tires have a tread that's up to 67% deeper than that of ordinary tires. Now available in *all-nylon* construction. Curved cleats give positive traction on or off-the-road.

See All-Purpose tires at your B. F. Goodrich retailer's. *B. F. Goodrich Tire Co., A Division of The B. F. Goodrich Co., Akron 18, Ohio.*

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For GREEN FEEDING or SILAGE it's the M-C CHOPPER

One man operation. One minute hook-up. Lets you get dry hay — hay for green feeding or silage. Use the year 'round for straw or stalks, for bedding.

"Loads the heaviest crops"

The M-C Chopper gives you a full 60" cut. Mows, chops and loads in one operation. Rugged construction—takes less power than most mowers, does a better and faster job. Chopper and wagon bunk feeder make green feeding easier than ever before. Send for free plans for making feeder.

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When your SHUR-RANE dealer delivers your registered system, you can be sure that it is ready for years of work at top efficiency.

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FARM TOOLS DIVISION
PITTSBURGH FORGINGS COMPANY
Thorn Street, Coraopolis, Pa.

A nurse tank of 1000 gallons capacity mounted on an old farm truck is used to service customers. "Any old tank will do for this," Godden says. "A water tank or anything you can pick up that will hold water. We have a meter on this tank, but if a farmer wants to own his own tank and save hauling, he won't need a meter." A new tank can be bought for $106 delivered.

Flo-lizer also has a spreader truck with a 32-foot sprayer boom which they use for custom application. The application of both straight nitrogen and complete mixtures has been quite profitable for Flo-lizer. They charge $1.00 an acre for applying plow-down fertilizer and for top-dressing wheat. One operator can apply five or six loads (one load, 1000 gallons or 5 tons) a day with a reasonable length of haul. The Standard Steel applicators used by Flo-lizer can do about 20 acres an hour. While some big farmers will want to own their own spreader trucks, the reasonable cost of having it done for $1 per acre will be attractive for the farmer who doesn't feel justified in buying a piece of equipment he uses only a few days a year.

Farmers in the Flo-lizer area are rapidly going to liquid fertilizer equipment. "While some of them are waiting until their old corn planters are worn out, most new planters have been bought with liquid applicators," Godden says. "Many farmers are buying conversion kits for their old planters. There are a number of makes on the market. The average cost runs from $80 to $100."

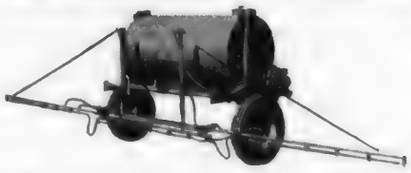
Humphrey and Godden are continuing their liquid nitrogen solutions business and have two applicators for side-dressing corn and other crops. The use of these solutions is firmly established in this big corn area and the sale and application seems to be a natural adjunct to the complete fertilizer business. The cost of an applicator, $500 to $1,500, insures a steady run of custom work for the future.

The Know-How of Operation

The mixing of a batch of liquid fertilizer requires little more than the ability to open a series of valves in succession, good enough eyesight to read the dial on the scales, and the strength to throw a switch or two. The amounts of NPK to use for various formulations requires simple arithmetic and if that is lacking, a set of tables is supplied by the manufacturers. The operation is about as automatic as an operation can be.

The care and maintenance of the equipment requires no more know-how than a farmer ordinarily expends each day on his tractor, the various motors and electric equipment he has around the farm, or his wife's washing machine. After a plant is erected the equipment makers send an engineer to the plant for a day

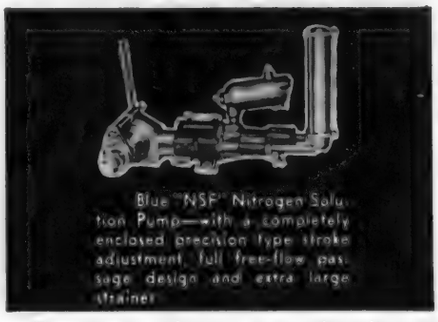
BLUE
Nitrogen Solution and Liquid Fertilizer Equipment



Blue "Chemi-Spreader" equipped with 20 ft. folding "Dribbleboom" and Model "LF" Liquid Fertilizer Pump.

Blue Sub-Surface Applicator with 14 ft. folding tool bar for application of Nitrogen Solution and Liquid Fertilizer.

Blue Model "LF" Liquid Fertilizer Pump for accurate metering of Liquid Fertilizer, Nitrogen Solutions and Aqua Ammonia.



Blue "NSF" Nitrogen Solution Pump—with a completely enclosed precision type stroke adjustment, full free-flow passage design and extra large strainer.

Yes, we manufacture a complete line of Tractor Mounted and Trailer Type Applicators for all kinds of Liquid Fertilizers and NH_3.

Write for complete information

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Dependable Farm Equipment Since 1886

or two to see that it is in working order and to instruct the operator.

"I could teach a kid to mix a batch of liquid in fifteen minutes," says Godden. "The valves admitting the acid, the nitrogen, and the water are opened in order and are closed when the meter indicates the amount for the formula has gone into the mixing tank. The potash is weighed and dumped in the tank and the same thing is true if a dry nitrogen, such as urea, is used instead of the liquid."

What Flo-lizer Makes

The number of formulations that can be mixed in a liquid fertilizer plant are in the hundreds. There are but two limitations. The first is imposed by the pH requirement. In order to formulate a neutral solution, the proportions of phosphoric acid to the alkalines (ammonia) must not be less than one unit of ammonia to three units of acid. The second requirement is that no mixture can have more than 32 total units of plant food. More than a total of 32 would cause the solution to "salt out," that is, there would be precipitation.

Don Humphrey explains this: "We cannot make a mixture without nitrogen, such as an 0-10-10 and have it neutral. We could not make it in our equipment since the mixing tank is mild steel and the acid would eat it up. It also would do the same to farmers' equipment and our application trucks. Several chemical companies are now working on a chemical that we can use as an additive to neu-

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every kernel on the cob . . .

Has capacity and strength to handle bushels per minute. New chamber and cylinder design assures complete shelling and separation with thorough cleaning by full-length screen, controlled air blast and dust-chute ramp. Bags or elevates corn up to 20 feet . . . stacks cobs to 10. Low-cost trailer, 3-point hitch, skid models. Also new field unit that hooks between picker and wagon. Send for catalogs and name of nearest dealer.

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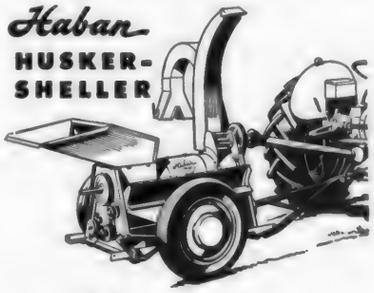

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Motorized Pull-Type Tiller. Gasoline or diesel powered. Requires only a medium sized tractor for towing. 7 ft. tillage width.

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Operated by P.T.O. mounts to most 2-3 plow tractors. Makes highly efficient use of tractor power. 3 ft. tillage width.

It's all in the new tine design — by SEAMAN-ANDWALL — the greatest reduction in horsepower requirement in the history of rotary tillage. Every tillage job now is done better with a cut in horsepower up to 28% — or more.

More than ever the SEAMAN-ANDWALL ROTARY TILLER provides higher production with much lower fuel costs . . . Works tighter, tougher soils and sod easier . . . Gives you faster forward travel . . . more acres of perfectly prepared tillage per day.

In fact — every type of work — turning in cover crops, chopping and mixing-in standing corn, clearing land of heavy brush, renovating pastures — all are now accomplished at such savings in time, labor and fuel that SEAMAN-ANDWALL Tillage is by far the lowest cost method of superior soil-fitting.

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Plants Grow Better, Bear Heavier and Longer. Their Hybrid Vigor makes more blossoms set fruits in bad weather. We'll mail you **10 Seeds FREE**, if you send stamp for postage.

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Giant Hybrid Tomato Garden (6753) For earliest and best fruits all season long, all any gardener needs is Burpee's new *Big Early Hybrid* and *Big Boy Hybrid*. **SPECIAL**—2 Pkts., 30 seeds of each. **$1.25 value postpaid for $1.00** (*send $1 bill at our risk*).

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IRRIGATION
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tralize the solution so we can make any analysis we want and still be able to have it neutral. That is not being used any place now that I know of, and is apparently not in the immediate future. Any mixture that we make has 1 unit of nitrogen to 3 units of P_2O_5 minimum because of the neutralizing of the acid.

"The aqua ammonia is alkaline and we use one unit of that to three units of P acid to neutralize the acid. If we use more than that ratio of aqua ammonia we would be on the alkaline side to a considerable degree and would not be making ammonia-phosphate, but rather diammonium phosphate, and the solution would salt out. After we get our 1 to 3 ratio of ammonia and acid, we have to add a supplemental nitrogen that is already neutral, that is, neither alkaline nor acid. Either urea, Sohigro II, or Uran meets these requirements. Uran is made by Allied Chemical, Sohigro II by Standard Oil of Ohio. We hope to have something available in the future to counteract the additional ammonia and keep our mixture neutral, if we use all ammonia for our nitrogen, but I do not know how soon. We can use either urea or a liquid nitrogen. Urea is slightly more expensive than a liquid nitrogen."

The most popular formula, Godden and Humphrey have found, is 8-8-8, which will cost farmers $46.20 per ton this year. Other formulations, with prices are as follows: 5-10-10, $44.60; 4-11-11, $41; 10-6-6, $47. Nitrogen solution, 20-0-0, will bring $48 per ton this year. These prices are in line, or lower, than dry prices in the Kingston area. Some plants use dyes for quick identification of the various formulas.

Plant Cost

The entire plant, including the spreader truck, cost Godden and Humphrey in the neighborhood of $50,000. The big item was the plant equipment, $14,000. Other big items were the building, $3,500; tanks, $5,900; wiring, $3,225; plumbing, $2,250, and well, $1,600. They feel that the wiring, plumbing, and the erection of the building were done at exceptionally low costs because of the reasonable labor conditions at Kingston. They were also able to pick up a Hough Payloader for $925, a rebuilt machine, whereas a new machine would have cost them $4,200. Their scales cost them $1,000, slightly used, a savings of about $800 over a new item.

"I know," says Humphrey, "that $50,000 seems a lot of money for a mixing plant, but we wanted the best of everything. As it stands, we have a highly efficient plant that one man can operate —automatic equipment costs money. We have a good capacity, 120 tons per eight-hour day. It is possible to put up a plant for $25,000 or even less, but I don't believe it could be as efficient as ours."

Humphrey and Godden, themselves,

Berry's Guarantee You
$2.75 per Hen Clear Profit
Over Feed Cost
or Chick Cost Refunded

$3.64 per Hen
Nat'l Average
Clear Reported
by Customers

George Berry Ernest Berry

A new chicken that lays as nigh as 25 dozen eggs for each 100 pounds of feed it eats is creating a sensation. Here is a farm-proved answer to the need for a profitable layer. In one large official laying test these rugged-as-a-mule Berigolds outlaid the average of 572 other hens. Laid 21 eggs average more per hen officially for year. Eggs averaged over 25 oz. per dozen.

$163 More Cash
per 100 Hens

In nationwide farm demonstration from Maine to California, 4,735 hens netted over $3.64 each, laid average 215 eggs per hen. At 40¢ a dozen this exceeds U. S. average gross egg income by $163 per 100 hens.

Customer	Profit Per Hen
Mrs. R. Jackson, Okla.	$4.04
Mrs. P. Roland, N. C.	3.54
Mrs. J. Meador, Ohio	2.00
Mrs. E. Hobbs, Maine	3.23
A. Jordan, Ohio	2.38
H. Gainey, Miss.	3.05
J. Clark, Tenn.	4.21
E. Coons, Ky.	5.93
Marie Krapf, N. Y.	3.32
Mrs. C. Jones, Mo.	3.35
Mrs. M. Shriver, Mo.	2.42
Mrs. H. Roettjer, Ia.	3.43
Mrs. A. Umxeheid, Ia.	3.87
W. Baker, Ark.	3.40
Mrs. L. Walters, Ky.	4.03
W. Parnell, S. C.	4.54
D. Baur, Colo.	3.15
M. B. Couthart, Calif.	5.81
A. Platt, Mexico	5.81
W. Berry, Texas	4.63
A. Erwin, Okla.	3.93
G. Duis, Colo.	4.52
M. Paul, Mo.	2.04
Grace Maisbury, Texas	2.41
M. Anderson, Mo.	2.56
R. Quaduor, Neb.	4.10
Average profit per hen	$3.64

1/2 PRICE DEMONSTRATION OFFER.

Berigolds and Bera-Queens, the new Top-Cross Hybrids will make you good profits, or chick cost refunded. You are urged to write today for further proof of profits. Limited number of demonstration chicks available in 300 to 1,000 pullet lots at special Demonstration Half Price offer. Write George Berry, 1507 Ajax Rd., Quincy, Illinois; or Ernest Berry, 1507 Sunflower Rd., Newton, Kans.; or Berigold Farms, Box 1507, Dawsonville, Ga.

Grow Renk's
Pedigreed Seed

Oats . . . Barley . . . Spring Wheat
Alfalfa . . . Clover . . . Grasses
Corn for the northern corn belt

The hybrid seed you plant can make more difference than many farmers realize. Renks never release a new seed variety unless it is at least 10 percent better than the old one. Renk seeds are developed in their own nursery, then sent to test growers to confirm their quality.

As practical farmers, the Renks know what their customers want . . . know seed performance . . . and know how to produce it. Renks prove their seed in their own fields . . . in their own feedlots.

You can make the right move now. Move yourself toward higher germination, better stands, bigger yields, and more profitable crop and livestock production.

Your first step is—Write for Renk Literature . . . Then order your 1957 seed from Renks.

WM. F. RENK & SONS, BOX 6, SUN PRAIRIE, WIS.

RENK Pedigreed SEED

buying a new rotary tiller?

your WISEST investment is an...

Ariens

Rotary Tiller with the WIDEST choice of models for every tilling job

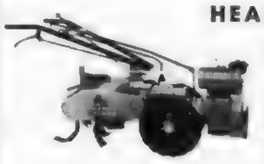
LIGHT DUTY

For "backyard" gardening! Ariens Yardster Rotary Tiller—12" tillage. 2 h.p. engine. 2-speed wheel drive with interchangeable, all-season attachments; or choose the Ariens Jr. tiller —12" tillage.

MEDIUM DUTY

The MultiMatic's handle swings horizontally 180° for 2-direction use with front or rear-mounted Insta-Hitch attachments. Kohler 3.6 h.p. engine. Ball and cam differential for fingertip steering, easy turnaround. 16" tillage. • Standard model has 2-direction operation, too! Many exclusive features!

HEAVY DUTY



Choice of two Trans-A-Matic models: TA-20A —8.1 h.p. Wis. engine; 20" tillage; or TA-28B —14.6 h.p. Wis. engine; 28" tillage. Ball and cam differential for easy steering; fingertip operating controls.

See your dealer or write:

Ariens COMPANY

117 Calumet St., Brillion, Wis.

did no actual labor on the plant, but they did supervise all the work. They did some shrewd buying, and were able to find good workmen. Their triumph was in assembling the various units—mixing machinery, tanks, pumps, meters—and shrewd buying.

There are a number of outfits selling a plant package; some of them include the building. Among them are the Standard Steel Manufacturing Co., Indianapolis, Ind.; the Midstate Company, Decatur, Ill.; the Butler Manufacturing Co., Kansas City, Mo., which sells a package which includes a Butler metal building; and the Carlile Corporation, Denver, Colorado, which specializes in balanced plant layouts and the mixing reactor circuit including convertor and the scrubber, on which patents have been applied for. This outfit will also engineer and erect a plant on commission. The type of building, the tanks, and other equipment are usually selected on the basis of personal preference by the buyer.

And Are There Profits?

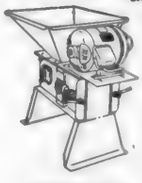
Humphrey and Godden are not reluctant to talk about their profits. Says Humphrey, "We haven't completed our first year (the fertilizer year is roughly from August to August), but we've made a profit and with a bigger volume in sight, we should make a living. We've found out that the bigger the volume the less per ton of overhead and the more profits. There's a big premium on efficiency and in good buying. I would say that an educated guess about possible profits would be 10 per cent on the ordinary plant to 20 per cent for the highly efficient plant doing a volume business."

Humphrey and Godden were able to solve the operating capital problem by bank credit and by an operating loan from a private individual. How much this should be depends on credit conditions in a particular area and the habits of farmers in paying their bills. Flo-lizer had never used more than $15,000 of its much larger line of credit. Farmers are getting away from the traditional "I'll pay you when I sell the hogs."

The Midstate Machinery Company, of Decatur, Ill., which operates a plant at Clinton, Ill., and makes a package plant,

CUT FEED COSTS 20%

WITH THE ORIGINAL "Little Britches" KRIMPER KRACKER



Stop wasteful feeding of whole grain. Roller crimp your grains for greater feeding profit. Amazing, low-cost "Little Britches" Krimper Kracker genuinely roller-crimps any grain for full digestion. Crimping makes grain bulky; makes 4 bu. do feeding work of five. Requires only ⅓ power of hammermills. Wagon box loader optional. Write for free literature, samples and prices.

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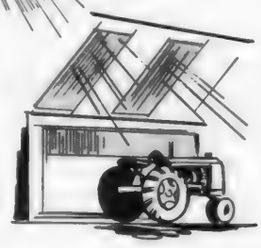
H. C. Davis Sons, Box FG-183, Bonner Springs, Kansas

Daylight's FREE!

Why not use it?



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Save building dollars with Granitized Corrulux, proven by comparative tests to outlast ordinary plastic panels up to 6 times longer. Reinforced with miles of high strength glass fibers, weatherproof Corrulux nests with metal or asbestos and is shatterproof, virtually unbreakable. Resistant to moisture, manure and ordinary farm chemicals. Requires minimum maintenance. Easily installed. Specify Corrulux, America's preferred low cost daylighting panel.

If you can hammer a nail...

you can install your own

Corrulux®

SKYLIGHTS — SIDELIGHTS

IN

- BROILER HOUSES
- TRACTOR SHEDS
- MILK HOUSES
- DAIRY BARNS
- WORK SHOPS

NAIL IT!
SAW IT!
DRILL IT!
BOLT IT!

WIDTHS TO 42"
LENGTHS TO 12'
FLAT OR CORRUGATED
WIDE COLOR RANGE

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Background for Farm Progress...

WISCONSIN-
powered equipment

New Holland Model 166 self-propelled baler, discharging bales to the side. One Wisconsin Engine provides power for ground travel; a second engine operates the automatic baler.

This Model 140 Case "top-lift" baler carries the bale right up to the bed of the trailer truck, saving both time and back-breaking labor.

This is the new McCormick self-propelled windrower, working in flax. Drive wheels have narrow tread for safe and easy highway transport.

Advancements in mechanized farm equipment, a few typical examples of which are shown here, are among today's important contributions to better farming, with less labor, at a better net return to the farmer. And this is where Wisconsin Heavy-Duty Air-Cooled Engines also play an important part.

No greater recognition could be received than the basic fact that these rugged, all-weather engines have been selected as standard power units on much of the equipment produced by the world's leading builders of farm machinery. The engine must of necessity match the reputation both of the equipment builder and his machines . . . in terms of *reliability* and *performance.*

By the same token, the universal acceptance and enthusiastic endorsement of Wisconsin Engines by thousands of farmer-users constitute a recommendation that cannot be surpassed . . . backed by more than 2,000 Authorized Wisconsin Service Stations in the United States and Canada.

As an active shareholder in Modern Farm Progress, increase and safeguard the productive capacity of your land and manpower with Wisconsin-powered equipment. Look at the *engine* as well as the *machine.*

Write for Wisconsin Engine Bulletin S-195.

WISCONSIN MOTOR CORP. Milwaukee 46, Wis.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

FARM PROFITS DEPEND ON KNOW HOW

Through 26 years Opekasit has acquired the "Know How" to increase YOUR farm profits.

If you have a farm in

Alabama	Kentucky	Pennsylvania
Florida	Maryland	South Carolina
Georgia	Michigan	Virginia
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and desire increased profits

Write today

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Burpee SEEDS GROW

See the newest and best flowers and vegetables, hundreds created by Burpee, pictured in America's favorite garden book—the big Burpee Seed and Bulb Catalog for 1967. Millions of families make it their year-round guide for a better garden. Filled with valuable information and advice—over 500 pictures, many in color. Helps plan your garden for a gorgeous floral display and plenty of fresh vegetables for your family all season long.

Burpee's Giant Gloriosa Daisies, 7 in. across, outstanding new flower of 1967, are on the front cover.

Has World's Best Seeds—zinnias, marigolds, petunias, snapdragons, all other flowers, and Burpee Hybrid Vegetables. A limited quantity of FREE catalogs reserved for new customers—*Write TODAY!*

WORLD'S LARGEST MAIL-ORDER SEED HOUSE

W. ATLEE BURPEE CO., 339 Burpee Building Philadelphia 32, Pa. *or* Clinton, Iowa *or* Riverside, Calif.

quotes cost and selling price data for the popular formulas in that area:

Formula	Retail Price	Cost of Ingredients including freight
12-8-4	$59.80	$39.75
10-10-10	59.97	41.05
10-5-5	51.64	32.18
9-9-9	53.97	36.52
5-10-10	45.62	30.13

At this plant around $3.00 per ton covers labor, overhead, depreciation, and other manufacturing costs. However, these are the big variables in operating a plant, and can vary greatly with the efficiency of operation.

And where is the break-even point in production? "We can only guess at any operation other than our own," Godden says. "We found that around 500 tons we were over the hump. Of course, we believe we have a highly efficient plant here. The less efficient a plant is, the more tonnage it would take to break even."

The raw materials for liquid mixtures are in good supply and getting better. Humphrey and Godden buy their urea, uran, and anhydrous ammonia from Olin Matheison, Allied Chemical, and Standard Oil. Their potash they buy from the United States Potash Company (62 per cent, high grade muriate of potash) and their phosphoric acid (75 per cent furnace grade) from Monsanto. Other suppliers in their area are American Potash and Virginia Carolina.

The potash costs them delivered, $40 per ton, acid $91 per ton, urea $101 per ton, and anhydrous ammonia (82 per cent) $88 per ton.

Dealers

Very soon after Humphrey and Godden decided to build a plant they saw the possibilities of extending their potential markets by commissioning dealers in areas farther away than their home plant could service efficiently. At these points they have put up 4000 gallon storage tanks to service the dealers' customers. The dealers own their own tank trucks for hauling from the plant to their storage and from their storage to farms. They also own their own spreader trucks. The tanks are owned jointly by the Flo-lizer Company and the dealer.

The Gimmicks

Humphrey and Godden anticipated a good deal of resistance to liquid fertilizer. Being farmers themselves they knew the tendency for a farmer to resist change and they were fully acquainted with the philosophy of what-was-good-enough for-pappy-is-good-enough-for-me. However, they were agreeably surprised to find a willingness to listen to the merits of the liquids. "The biggest selling point we had," says Godden, "was that the liquids would eliminate the lifting and labor and time it took with dry fertilizer."

"After that," added Humphrey, "they wanted to be convinced that the liquid would do as good or better job than dry. One of the best things we did to convince them of this was to use our liquid on a half-dozen rows in their corn field right beside a half dozen rows on which they used their customary dry fertilizer as a control. When they found they got just as good results, they were convinced. We also got a report from the State University on experiments with both kinds in which there was no apparent difference in the results from the two types.

"One of the most persistent questions, was, 'Won't liquid fertilizer leach into the ground and won't it wash off during a rain?' It's pretty hard to explain ionization while leaning over a fence during the busy season. Mostly they've had to take our word that liquid fertilizer won't be lost. A lot of them are still not convinced, but a good crop demonstration usually sells them."

"Then we had the price situation to face," Godden recalled. "This was easy, because we found we could meet competition, and in some cases better it."

The business has two peak periods, in spring at corn planting time, and in the early fall when wheat, plow-down, and pastures are getting treatment. Preceding the high peak at corn planting time, there is a steady demand for nitrogen for spring top dressing of wheat and pastures. Between these seasons the operator can spend on his farm, if he has a farm, or go fishing. Some owners are doing a small package business and some are taking highway contracts for fertilizing and seeding along the highways.

Both Godden and Humphrey feel that once they get into full production, and are able to supply their product when and where it is needed without delay, they will get an increasing share of the 70,000 tons of fertilizer used each year in their community. And that will pay them off well for the courage it took to jump into a new business and pioneer the construction of a new plant.

Other Plants

In operation, sales methods, and equipment, the Flo-lizer plant is typical, with slight local exceptions, of the score or so plants in the corn areas of the Midwest. Many of the plants have a free soil testing service. A new Indiana law requires that the liquid must be sold by weight and not by meter.

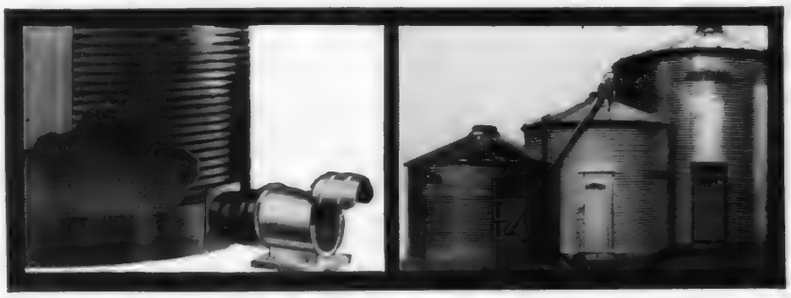
The plant at Lodoga, Indiana, owned and operated by Fred Busenbark and his son, Victor, has the first package plant sold by Standard Steel. This plant, which includes all the mixing equipment, including the stainless steel mixing tank, is selling for around $12,000. There is no convertor with this plant, but the Busenbarks say that except when mixing such formulas as 8-24-0 and 6-18-6 they have had little heating troubles with Uran.

BUTLER GRAIN BINS

Safest, most convenient grain storage yet ...and here's why:

VAULT-TYPE DOOR makes tight seal and keeps out moisture. Metal door slats simplify unloading and sampling. Double-bolted vertical seams add to bin strength, make seams tighter.

EASY-ACCESS manhole cover and built-in roof ladder with hand rails make it easier and faster to inspect, test and sample grain. All seams in corrugated siding are weather-sealed with easy-to-apply strip caulking.



BUTLER FORCE-AIRE equipment conditions grain, maintains safe moisture level, prevents heating and infestation.

ALL SIZES for every storage need. Capacities from 500 to 4,400 bushels, diameters from 10 to 21 ft., heights 8 to 16 ft.

Plan now to take a second profit on next year's crop. This winter, while you have time, erect Butler grain bins on your farm. Then, when your crop comes in, you are equipped to hold it for higher market prices or seal it and earn the storage charges. With safe Butler storage, your grain stays dry and seed clean. Rodents or birds can't get in to lower grade . . . weather is sealed out.

See your Blue Ribbon dealer for prices. He offers the complete line of Butler farm equipment, grain storage, drying, handling and testing equipment, feeding and watering equipment. Write us if you don't know his name.

BUTLER STEEL PRODUCTS

BUTLER MANUFACTURING COMPANY

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Manufacturers of Farm Equipment • Oil Equipment
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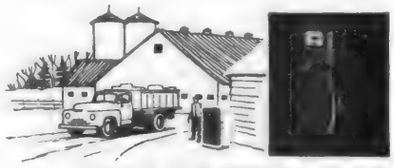
REDUCE FIRE RISKS!

FUEL UP SAFELY with

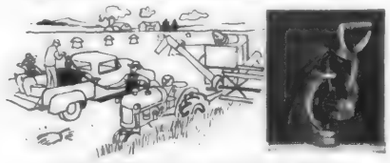
QUALITY TOKHEIM GASOLINE PUMPS

Eliminate the hazards—the headaches—of refueling farm machinery! Replace risky, rickety, obsolete equipment with modern, pilfer-proof gasoline pumps from Tokheim! You'll be able to gas up trucks, tractors, other machinery quickly and safely, whenever and wherever convenient—and save money, too!



MODEL 43 (ELECTRIC)
Easy-to-reach nozzle, easy-to-read dial, plenty of hose. Delivers 10 gal. per minute without effort. Weather-defying finish.

MODEL 44 PORTABLE (ELECTRIC)
For use on skid tanks or with underground tanks. Has self-adjusting suction tube, rugged ¼ hp, 110-volt motor. Delivers 10 gpm.



NEW MODEL 476 (HAND PUMP)
Use in farmyard or distant fields. Has automatic shut-off nozzle, flexible suction hose. Pumps 12 gpm. Double-action. Easy to install!

These Tokheim Pumps are proved in thousands of installations. Ask your oil company, or your Tokheim representative how easily you can modernize with Tokheim!

QUALITY TOKHEIM

Write for FREE BOOKLET
"How To Install Underground Tanks"

General Products Division
TOKHEIM CORPORATION
1626 WABASH AVE., FORT WAYNE 1, INDIANA

Factory Branch: 475 Ninth St., San Francisco 3, Calif.
In Canada: Tokheim-Reeder, 205 Yonge St., Toronto, Ont.

They set 500 tons as a break-even point last year, their first, and doubled that in their first year of operation. They sell a planter kit for $35. They charge 50 cents an acre for spreading and now have five dealers, soon to be increased.

The Thorntown, Indiana, plant is owned by a corporation. The plant manager and part owner is Robert Gatewood, a red-headed ball of fire, who reports a sale of 1770 tons in the first year of operation, and 2,300 tons since March 1 to September 1, 1956. The plant is housed in an old serum plant and is said to be the model for the Standard Steel package. No convertor is used and the mixing tank is fiberglass lined, a substitute for the more expensive stainless steel job. Sold under the name of ASCO, the product is handled by 12 dealers. They deliver to some dealers by semi-trailer up to 64 miles away. ASCO maintains a regular soil testing service of the simple Purdue type, as most of the plants do, and has recently gone into the small package business.

The CDK plant at Kitchel, Indiana, owned and operated by a three-man company, started out as a rock phosphate and lime business. The plant does not have a convertor, buying liquid nitrogen and using mostly Uran as a source of nitrogen. CDK maintains a soil testing service and last year sold 3,000 tons, double the first-year production. The CDK plant is a model of neatness and efficiency. One man operates the plant with occasional help in the busy season.

THE ROCK CORNISH

(*Continued from page 77*)

of the major selling points was a beautiful bird suitable for an individual serving.

By January of 1950, Makowsky was shipping his replacement bird to his old customers. They accepted the new bird, but Makowsky, himself, did not realize with what enthusiasm they took to his new creation. His enlightenment came when, after months of rebuilding the guinea flock, he cut off Rock Cornish shipments and went back to the original bird. The reaction was immediate and practically unanimous; by letter, telephone, and telegraph—as a matter of fact by every form of communication other than smoke signals and carrier pigeons—the majority of his customers informed him that they preferred the Rock Cornish bird and no nonsense.

When Makowsky read this reaction of the professionals in the field, he abandoned once and for all the idea of a family-sized hobby. He forgot about retirement and began to organize the business on a big scale.

To insure a steady supply of the new bird, he arranged with a breeder-hatcheryman to increase the Cornish and White Rock strains and to begin shipping him

IMPORTANT MESSAGE

...if you want to make more farm profits

You can make your farm net you $1,000 *more* next year. Others have done it with C & L Silver Shield Silos and Buckeye Cribs and Bins. You can, too. The extra profits they save for you can actually pay for a silo in a year or two and more than pay for a crib or bin. C & L's extra-heavy gauge steel construction, advanced design, and farm tested engineering features—make C & L farm storage structures your best buy, by far. Easy financing, too. Write for full information today—no obligation. Simply state whether you're interested in a silo, crib or bin. Do it *now!*

C&L CLAYTON & LAMBERT

Clayton & Lambert
1025 LAMNECK STREET
MIDDLETOWN, OHIO

INCREASE FARM PROFITS!

KILLS CORN BORERS by pulverizing, mulching and firming soil on cornstalks that have been plowed under — corn borers are smothered in ground. Saves time, labor, horsepower, preparing ideal seedbed. Leaves surface mulch without grooves to help prevent washing. Seedbed conserves moisture — more seeds grow. Helps increase yields of all crops. SEEDBED MAKER has 3 in 1 Combination spring tooth harrow, sprocket packer and mulcher with seeder available. Once over your plowed field with this machine does the ideal job. Write today.

TRAILER MOUNTED FOR POWER TAKE-OFF. Has traveling feed table. Especially designed for grinding or chopping larger quantities of loose or baled hay and any roughage. Comes with or without Trailer Mount and P.T.O. Both cutter knives and heavy swing hammers. Grinds any feed, wet or dry, snapped or ear corn, roughage bundles or baled flakes with farm tractor. Write for details.

WESTERN LAND ROLLER CO., Dept. FQ-37
Hastings, Nebraska - Manufacturers

day-old cross-bred chickens. He now has four such breeders under contract. He then went to neighboring broiler raisers and offered to supply them with chicks, feed, heat, electricity, and water, and in return for their labor and equipment, to pay them a weekly salary based on the number of chickens they raised. The first few farmers, who may have felt a little guilty about taking a city man on such a deal, have now grown to 54. And, with these two arrangements, Makowsky kept in his own hands the quality control of his product. Since the dressed bird sells for $1.33 a pound, quality is the essence of the whole operation.

Dressing up this product is a natural for Makowsky, who made a fortune in France and another in America designing boxes for the luxury trade. He first takes his plucked, eviscerated little bird and seals it into a plastic bag. When this bag is dipped for a few seconds into boiling water it shrinks to skin tightness around the chicken and shows off the broad meaty breast and the plump drumsticks. This sealed package is then individually boxed in an attractive carton on which an introduction to the new bird and cooking directions are printed. In the early days, Makowsky insisted on selling only iced fresh birds; experimentation, however, has now convinced him that frozen Rock Cornish taste as good if they have been handled properly.

For the first two years Makowsky produced and sold some 50,000 of his well-packaged birds. A few columnists and food editors mentioned the unusual bird and restaurants featured it as the Idle Wild Rock Cornish on their menus. As word of the delicious single-serving chicken spread, sales mounted. In 1952, sales jumped to 200,000, doubled in 1953 and reached 750,000 in 1954. During this period the killing and packing building, which started with 900 square feet of space, was enlarged again and again. The office, started on a glassed-in porch of the Makowsky home with one secretary, grew at such a rate that it threatened to push the family out into the yard. In 1955 sales topped the million mark and this year doubled, going over 2,000,000 birds. Threatened with eviction from his own home by the success of his business, Makowsky once more enlarged the packing area and added a modern office building with space for a score of office assistants and private offices for himself and the managerial personnel. Now, behind his quiet country home he has created a small city with parking areas, truck loading docks, floor space for more than a hundred workers, freezing plants, storage buildings, and a long coop which produces the 30,000 guineas which he still raises. With this year's additions, which enlarged the floor space to 19,000 square feet, and with a rearrangement of the killing and packing floors, Makowsky now has a plant that qualifies for federal meat inspection—a program he enthusiastically supports.

From this building, Bill Larson, who has proved to be an able administrator, supervises the production of the birds. The flow of the chicks from the hatcheries is regulated as nearly as possible to meet the demand for birds five or six weeks away. The chicks are sexed at the hatchery and are raised in separate pens for more even batches. Growers, like August Nicola, one of the many Finns who have migrated to this area, have their coops clean and warmed when the chicks arrive. During their five-week growing period they are kept on a high-quality starter mash of 24 per cent protein. Curiously, Makowsky who talks freely about any of his merchandising tricks—which most farmers know little about and would give their eye teeth to learn—is reluctant to reveal exact facts about breeding and feeding—which most farmers can guess—because he feels that they are his trade secrets. He will admit that he uses no fish meal or fish solubles in the feed for fear of flavoring the meat. He also admits that the chickens are put through on a single formula from hatching to hatchet and that Idle Wild is constantly working with nutritionists on improving the feed.

The real trade secret at Idle Wild is the endless care that is taken to insure quality. During the growing period one of Bill Larson's two assistants visits each grower twice a week to check on growing conditions. At five weeks, when the cockerels weigh from a pound seven ounces to a pound ten ounces, the

America's cattlemen need practical, timely, useful information and again...

DIGEST ADVICE "PAYS OFF"

HARRY WILLSON (above), who operates Sunnyland Farms at Albany, Georgia, has been a subscriber to the Doane Agricultural Digest since 1953. Here's his view of just one recommendation in the Digest:

"Their advice to feed cattle on pasture in 1956 appears excellent, and I feel that by doing this the cattle will make more money than any I have ever handled."

YES . . . The Digest has top-notch production and marketing recommendations for cattle breeders and feeders. Through its swift twice-monthly reports, the Digest also proves a big help to farmers and ranchers whose main interests are hogs, sheep and lambs, dairying, poultry, corn, soybeans, wheat, oats, cotton, tobacco . . . or any other important commodity.

PROVE IT TO YOURSELF. Still, there's only one simple, low-cost way to prove to yourself how efficiently and economically the Digest will serve YOU. That's by reading its confidential, twice-monthly reports for a year.

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ON-THE-SPOT REPORTS. Other vital contributors to the Digest are Doane's own farm managers. These men are entrusted with the management of over half a million acres of crop and range land from coast to coast. Rounding out our sources of information are alert correspondents in other key agricultural areas.

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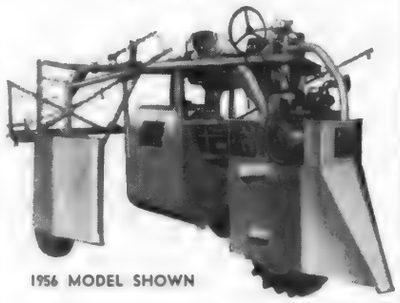

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catching crews visit the farm early in the morning and take all birds within these weights. To insure uniformity, they weigh any borderline birds. By the end of the sixth week the catchers have hauled away all of the birds and the farmer is given a few days to clean up the coops for the next batch.

During the growing and catching operations the birds are culled for any showing deformity or disease, but the most critical culling takes place in the dressing room. Here, under lights, the plucked bird is scrutinized for bruises, broken skin, or other blemishes. When such birds show up, they are packed and sold as seconds without the Idle Wild label.

At the end of the production line where the birds are killed, plucked, shorn of wing tips and legs, eviscerated, and bagged, they are carefully separated into four weight groups. Weighed by ounces they run from 12 to 14, 14 to 16, 16 to 18, and for the double serving bird, from 28 to 32 ounces. From this point some are shipped fresh packed in flake ice and dry ice and others go to the freezing room, where they are blast frozen at 20 below zero and then stored in a separate freezer at 10 below. Recently Makowsky added variety to his product by having some birds completely boned and others boned and stuffed with an exotic stuffing made of wild rice, mushrooms, diced ham, "21" sauce maison, and a dash of imported cognac. This autumn, the line was enlarged still more by adding several canned items, roasted and stuffed birds, Cornish Rock soup, cranberry sauce, and a rice pudding combination which is to other rice puddings what the Cornish Rock is to an old stewing hen.

With success has come competition. Men like Victor Borge, whose interest in poultry is second only to his passion for the piano, and poultrymen like Eugene Hale, of Unionville, Conn., are working hard to raise as good a bird or a better one and are trying to better Idle Wild's price. Hale, who raises all of his own birds and packs them under his own label, employs two men and six girls in his operation. He ships around 4,000 frozen birds a week and has some $35,000 tied up in a freezing, picking, and eviscerating plant. "We feel," he said, "that we are about as small an operation as can be run economically. If we tried to operate with less volume, we couldn't afford to run the packing part of the operation. And if we shipped live birds and let someone else do the killing and packing, they would take all of the profit out of the business. I know; I've been in the poultry business for a long time and I've seen what they charge for killing, picking and eviscerating."

In the long run, men like Hale will give Idle Wild the toughest fight. Right now, however, Makowsky is most worried about the competitors who are cheapening the product and, in his opinion, may kill off

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the market for the small bird. Some of these are raising a bird of nondescript breeding and then *making* it into a broad-breasted bird by clipping the breast bone and flattening out the meat or by simply whacking the carcass on the breast and crushing the bone. What the housewife sees is a broad-breasted little bird selling for less than the fabulous prices she has heard quoted on this new chicken. What she gets is a chicken of no particular distinction with dark meat on the legs and white meat, mixed with flakes of crushed bone, on the breast. She is not likely to go on sampling the various birds on the market after she has been stung once.

"This business is very tempting to one who has not been in it," Makowsky admitted. "They see that the birds are selling for almost two dollars on the market and they say, 'Makowsky is raising them for forty-seven cents a bird. We could raise them for a few cents less and sell them for less and still make a fabulous profit.' And they forget that one must pluck the birds in an expensive building with costly equipment and high-priced labor and that more labor goes into eviscerating and preparing them, that they are then put into a bag that costs four cents, packed in flake ice from a machine that you must buy, or frozen and stored in big rooms that must be built and equipped. They forget that the product

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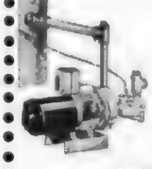

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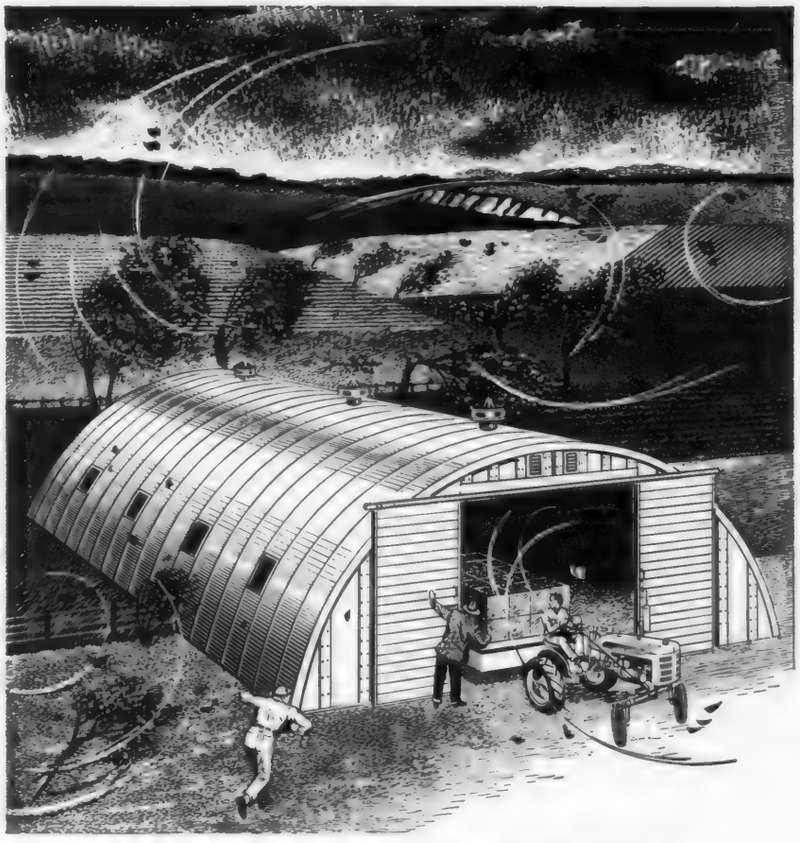

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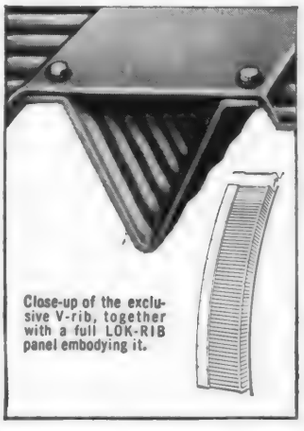

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22 Tools for all Yard and Garden Work

This amazing little tractor (only 27½" high) turns yard work into carefree FUN. Save your back and do all yard jobs in ¼ the time —every season. Let Wheel-Horse "Ride-Away" do the work while you just sit and steer! In winter, Snow Plow clears driveways of heavy snow in a jiffy. In summer, 3-gang mower cuts 5 ft. swath! 30" lawnsweeper with self-dumping hamper whisks lawn clean. Haul compost — Plow — Cultivate — Use any of 22 attachments for all lawn and garden jobs. This versatile fun-work tractor has five forward speeds—and a reverse! Powered by husky 3½ hp. (or 2¼ hp.) engine on heavy channel steel chassis.

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not mean that someone else with flatter land or using irrigation or, perhaps, with a system of separating the older beans, couldn't make a go of it. The point is that the person who starts a new product and who pushes it vigorously has an initial advantage that should bring him the best returns.

"That has been our experience here. No one knows of what tomorrow is made," he concluded and his face became that of a wise mystic, "but we can hope that this business will level off to a more normal healthy rate of growth. In the past year I have found a little leisure to do some work with mosaic decorations and I would like to do more with it."

Therese, his wife, said nothing, but in her eye was a look which any husband would recognize. It said, "Here we go again."

Jacques Makowsky said, "This is the way I would launch a new specialty item from my farm:

1. Study the market here and abroad to find an item that we are not producing, but which we would buy.

2. Study and test my own farm situation to see if I could fill this need.

3. Find a few customers who would be willing to test the item over a limited period.

4. Begin production and search out as many of the problems of raising the specialty crop as can possibly be foreseen—and there will be many of them.

5. As the specialty gains acceptance with the first customers, call it to the attention of as many people in the food field as you can reach. Every daily paper has a woman's page whose editor is always searching for new material. Every columnist occasionally likes to write about a meal he has eaten. Women's magazines do a wonderful job of writing about food and illustrating their articles with colored photographs which are almost succulent.

6. Arrange for credit in order to expand the operation to keep up with sales—you must keep customers supplied.

7. With increasing production will come a terrible temptation to relax quality. Quality must be maintained.

8. With expansion will come the need to have the product handled by dealers outside the local market. These dealers must be serviced—you must supply them with advertising and display material; you must keep them enthusiastic about the product; you must send salesmen into their territory to help them find new customers and to arrange for publicity for the product.

9. With success will come competition. You must be prepared to fight for your market with advertising and efficient distribution. Your best weapon will be the quality of your product. If you, yourself, have cheapened the product, you will be sunk.

10. Once your specialty is launched you will have to think of new ways to exploit it such as freezing, canning, drying, bottling. You will be confronted always with the need to improve the product."

THE DAIRY BARN

(*Continued from page* 30)

years old with an average monthly milk production of 18,000 pounds and would pay from $64.85 to $69.43 at age 65. One of the plans also provides for group life insurance.

Farmers interested in more details on this retirement program should write to Ralph M. Cooper, Tenney Building, 110 East Main Street, Madison, Wisconsin.

Thyroprotein? No, Thanks. Thyroprotein, a thyroactive material which has been available to dairymen in commercial feeds for some years, has shown up rather poorly in tests completed recently by USDA dairy scientists. The object of the use of this drug has been to stimulate milk production. In individual instances it has done just what was expected of it. It has increased the production of some cows as much as 20 per cent for short periods. But it does not increase production for the entire lactation.

It seems to make no difference whether the drug is removed from the feed abruptly or gradually; once it is removed there follows a sharp decline or cessation of milk production.

In comparing control animals with those on the thyroprotein supplemented feed it was found that in two out of three tests feed efficiency for milk production was similar in treated and control groups if the periods during and after thyroprotein feeding were considered together.

Individual cows showed wide variation in response to the treatment. Returns above feed costs increased in treated groups which gave the best response to the drug, but they decreased in those which gave average or below average response.

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Farmers everywhere are building their entire feeding programs around these big, dependable Farmhand Feeders. They're the best-engineered and best-constructed on the market!

SAVINGS OF UP TO 50% in time and labor costs are possible with a Farmhand "Power-Box" Feeder because one man can do the whole job. The feed is thoroughly mixed and unloaded into your feed bunks as you drive along. The 2-beater, 18" belt-discharge Feeder shown here unloads completely, by PTO power, in 1 to 4 minutes. Mounts for front or rear discharge on truck, Farmhand Heavy-Duty Wagon or Tandem Trailer.

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3904 Green Street — Anchor, Illinois

SHE'S SORT OF AN ANTIQUE

(*Continued from page* 73)

Louise's been all gone over. Inspected by the state boiler inspector. She's in Al shape. Better shape than Bill is, I guess. He's kind of crippled up but he springs to life when the steam gets up and the engine starts to spit. You can see his face glow. He goes along more for the good time than for the pay. He had a stroke once, but being with the engine seems to restore him to health. He's an old thresherman like me and nothing gets him madder than for some one to toss a tree branch in the separator. When the machine is hurting, you feel the hurt inside, too."

Walter wasn't satisfied with only a whistle. He wanted a bell also. "I have about a hundred dollars in that bell," he says. "Got it from a junk man who was a tough one to deal with. An old railroad man. He knew a good bell when he saw one. That bell came from an old wood-burning locomotive. Listen to that tone!"

"Smoke in the Valley; Someone is Threshing"

Men like Walter Crouse don't consider themselves just engineers. Their engines, used for shredding, sawmilling or any other purpose requiring stationary power, are, of course, nearest their hearts, but they like to think of themselves primarily as threshermen. Threshermen have always been a proud and respected lot, men of calibre who in their heyday had their own national brotherhood, their professional magazines, conventions and strict requirements for membership. To them, and to most farmers of their day, steam engines meant threshing and threshing was a labor of love.

It took 20 to 25 men to do a good job of threshing. In the field 6 to 8 pitched bundles, 8 teamsters on bundle wagons was usual, with 2 to 4 men on the grain boxes, plus men in the mow or at the stack. The feeder stood on the separator platform, the fireman tended the boiler and the engineer ran the show. A "water-monkey" kept his team busy hauling water for the boiler. Often a boy tended the wetted burlap-covered water jug in the field.

Preparations began early. Women were busy in the kitchen days ahead. A jag of coal had to be gotten from town, for each farmer supplied the coal for his own run. The hogs got their minerals from the left-over lumps. The threshing rig—engine drawing separator, team drawing water tank—often pulled in for a setting late at night and the engine crew, too far from home for horseback travel, would put up in the hayloft. At 4 a.m. they turned out to stoke the boiler fire. One long toot on the whistle meant steam was up and "she" was ready to roll. By 7 the first bundle wagon jolted into the lot from the fields and another farm-owner,

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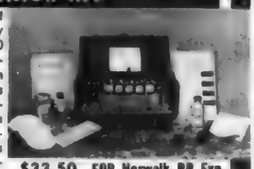
All the reagents and materials necessary to make 100 to 300 tests for the following plant growth factors: Nitrates Phosphorus • Potassium • Calcium Ammonium • Acidity; plus tissue tests for Nitrates, Phosphorus and Potassium.



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100 Tests for the following five growth factors: Nitrates Phosphorus • Potassium • Ammonium Acidity; plus tissue tests for Nitrates, Phosphorus and Potassium.

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The SIMPLEX Soil Tester is based on scientific methods devised at Michigan State College by Dr. Charles H. Spurway. You should have the SIMPLEX Soil Tester to increase soil productivity and your profits.

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Don't cull good cows, lose identity of purebred calves, make errors in breeding and ownership. Use these big numbered brass tags with strong 40" steel chains. Specify numbers wanted. Order PD544, 12 for.. $15.95 ppd.

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Identify groups—age, breeding feeding, etc.—by color, individuals by number. Similar to brass tags above but made of heavy-duty plastic with big easily-read numbers. Specify color and numbers wanted. Order PD437. With 40" steel chains, per doz., ppd. $11.95

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Easy, simple and safe. Dehorn and castrate calves. Dock and castrate lambs. Remove horns up to 10" long. To use, just place rubber band. Widely used and recommended. Order PD232-233. Elastrator with 100 rubber bands, ppd. $14.30

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NASCO offers world's most complete line of artificial breeding equipment. Dairyman's Kit includes steel chest, two vacuum bottles, holders for clean and used tubes, semen vials. Ample space for gloves, speculum, towels, etc. Wt. 10 lbs. Order A80 Dairyman's Insemination Kit... $15.40

NATIONAL AGRICULTURAL SUPPLY CO., Fort Atkinson 55, Wis.

scanning the sky, felt more assured that his harvest would beat the weather.

The sun grew hot and the sweat ran. Smoke belched, soot dropped, fumes smarted the eyes. The straw spewed from the pipe snout, working into shoes, down itching backs. Swirling chaff filled nose and mouth. Over all was noise, the flapping belts, the droning separator, the spitting, clanking, hissing engine.

Competition and practical joking among the crew made short work of the morning. Your innards told you it was dinner time before the 11 o'clock whistle sounded. On the back porch, all the family's soap and combs and feed-sack towels were waiting beside the wash pans lined up on benches. A washboiler full of coffee steamed on the oil stove in the laundry lean-to. At the table, the trenchermen dug into the heaping platters, the oldsters cornered the high talk, eyeing the five kinds of pie, and the womenfolk kept up a steady parade to the kitchen, content with their fate of a leisurely second table after the men returned to the threshing. The threshing dinner was a farm wife's hour in the sun; before many days everyone in the area would know what kind of table she had set. A man could be invited into the best threshing rings on his wife's reputation as a cook.

After dinner the noise and confusion began again. The wheat got drier and changing the grain boxes kept the teamsters hopping. When the cows came mooing up to the fence, waiting to be milked, it was time to throw the throttle. The sudden silence felt odd in your eardrums. There wasn't much time before dark to oil up and to clean the gummed dust and the thistledown from the sides of the engine. That was a day measured by light to see and work by, not by clock or writ.

THE CHRISTMAS PROGRAM

(*Continued from page* 42)

At our homes we rushed through supper and barn chores with unusual speed. Then, in the starlit darkness, the whole family piled into the straw-filled wagon —"The Night" began.

A stray Christmas angel hovering over our Loon Lake School District could see, through the falling snow, a dimly lighted one-room school as a sort of hub of a wheel. Converging on the dim light from all roads were slow moving buggies and wagons. If the roads were covered with snow, there were sleighs in the procession.

Wondrous to see, through the falling snow, the unfamiliar sight of a lighted school house! This was the only occasion when our school was not deserted-looking at night. As we neared the beautifully lit building, anticipatory thrills ran up and down our spines and the magic of "The Night" deepened.

Sandhills "CABLE-TYPE" CURRIER & OILER

NO BRUSHES, ROPES OR FABRIC

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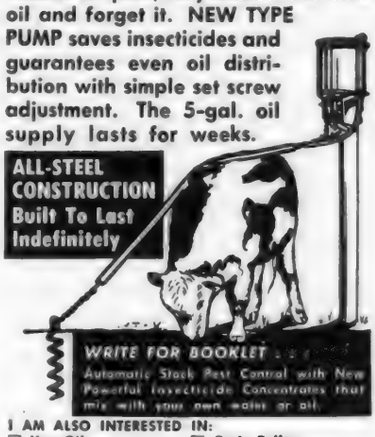

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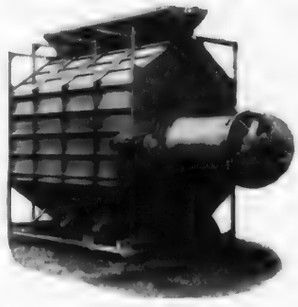

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We took our assigned seats, where we looked upon each other with speechless awe. Everybody was in his Sunday best. The girls had ribbons in their freshly curled hair and the boys wore their best suits, with white shirts and ties.

Our teacher was everywhere at once. The hint of hysteria of the past week was replaced by a calm assurance of a successful accomplishment. She played the pump organ for our opening song. The old organ didn't like the cold, and some of the keys stuck, but the melodies were familiar and we hardly noticed.

Backstage, miraculously keeping track of the books and magazines in which were our pieces and plays, the teacher cued lines while helping us don our costumes. Pillows had to be stuffed into the yawning cavity of a youthful Santa's trousers. Angel wings had to be adjusted, burnt cork applied to the unprotesting faces of comedy-act-performers, crepe paper Mother Goose costumes were pinned just so—. Stage business was managed with military precision; we knew just when to leave our out-front seats to be ready for our on-stage parts. Each of us had been assigned younger pupils whom we were to help. The big kids helped the little kids, on down the line. We talked in whispers —to make a noise would destroy the illusion out front. And out front, all was expectancy, and the hush before the first curtain.

Between acts the teacher kept a sharp eye on those delegated to removing and bringing on scenery and props. And she often paused to hold the trembling hand of a timid first-grader as he quavered out his long-practiced piece. To forget a line would have broken his heart and disappointed his parents, yet to venture on stage in front of all those people was impossible without a little moral support.

So "The Night" wore on with the teacher playing her role of musician, stage director, make-up man, prompter and instiller of confidence.

Just as the heavy eyelids of the weary pre-schoolers were drooping, a jingling of sleigh bells was heard outside. A thrilling happiness vibrated through the air, touching young and old. The masked, white-bearded "school-board Santa" became the real, living Christmas Spirit. Those of us who knew Santa stuff was make-believe, knew also that this night our souls climbed to dizzying heights of happiness. Santa passed out the treat, a bag of candy and an orange, and was gone again into the night.

Perhaps that stray Christmas angel hovering low over our little school may have folded his wings and crept quietly inside. Somehow we really felt like being "kind one to another, tenderhearted, forgiving one another."

Program Night ended with the "Star of the East," sung by a nervous soprano borrowed from the church choir. I know

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now she wasn't much of a soloist, but to me then the yearning, muted notes rose and fell in sweet sadness, flooding the air with a mystical cadence. Then the old organ, its unpredictable keys either warmed by the stove's heat or perhaps awakened from silence by the spirit of Chrstmas, released lovely, mellowed music.

Of such power was the spell woven about us that we not only forgave each other, we even forgave our teacher, her sternness and her impatience. After all it was she who had brought us a little nearer the angels, kings and queens for a night.

Whether we faltered in our lines or carried them through without a break, we were all part of a glorious thing. And our parents, smiling encouragingly, applauding, were each in their hearts saying as we appeared on the flimsy stage, lighted by flickering lanterns, "That's my son, that's my daughter."

THE AUTHOR: Marion Cody Seddon, a transplanted Michigander, has lived in California eight years. Program Night is a personal experience for she taught school in a one-room rural school in Michigan before she was married. Several times each year, with her husband and children, she takes off in a house trailer in search of story material. She has published numerous how-to-do, travel, and personality pieces.

GRASSES FOR THE SOIL BANK

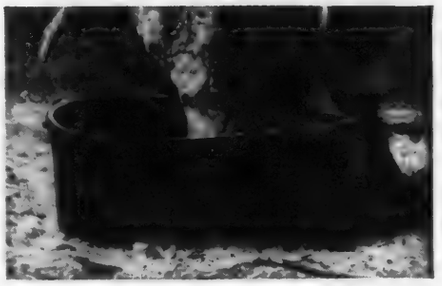
(*Continued from page* 56)

Agronomists and seedmen around the country suggest the following points in managing conservation acres:

1) Use both grasses and legumes in seeding mixtures wherever possible. Most grasses are long lived, are tolerant of adverse conditions, are relatively safe from insects and diseases and develop root systems which are powerful soil holders. The legumes supply nitrogen from the air to help the growth of the grass. They also produce large amounts of organic matter which decays easily. Should an emergency arise during which grazing the stand would be permitted, they will increase its feeding value.

2) Obviously, long lived or re-seeding types of grasses and legumes should be used. Wisconsin and other northern states are insisting that only hardy, wilt-resistant alfalfa be sown on the soil bank lands.

3) While most states are recommending the same seeding rates for the conservation reserve as they require for standard Agricultural Conservation Program practices, many of the experts are suggesting lighter rates since heavy crops which are neither grazed nor cut for hay could have a smothering effect. F. V. Burcalow, extension professor of agronomy at the University of Wisconsin, for example, suggests that the approved Wisconsin ACP mixtures be reduced by two pounds of legumes. Thus the standard Wisconsin recommendation of 8 pounds legumes and 4 pounds brome grass or timothy would be reduced to only 6 pounds legumes plus the 4 pounds of grass.



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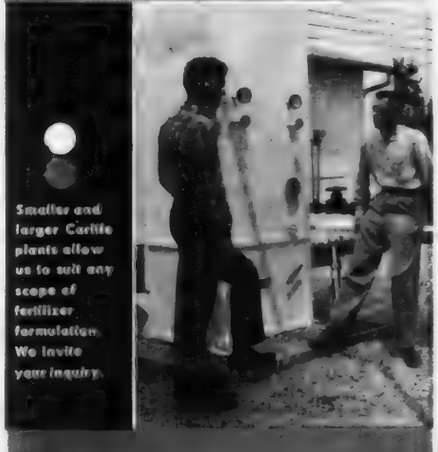

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4) Use only good quality seed of good germination and free from noxious weeds.

5) Follow good basic management practices; prepare an adequate seed-bed, inoculate all legume seed.

6) Sericea lespedeza is one of the legumes being looked upon most favorably to provide vegetative cover over the long pull—even for the full 10-year period—in the southeast and even as far north as southern Illinois. It will do well on soils of lower fertility, does a good job of controlling weeds and will leave the soil in an improved condition.

7) Actual management of the conservation reserve acres will differ very little from management under ordinary farm conditions, according to Earl C. Spurrier, assistant professor of crops extension, University of Illinois. Professor Spurrier goes on to predict that "there will no doubt be some killing of some of the less vigorous plants and there will probably be quite a build-up of certain fungus diseases which attack some of the species of legumes." Leaf spot is one of these diseases which in conjunction with the smothering effect of the debris from dead plants may eventually cause the alfalfa and other legumes in a mixture to play out and leave the field to grass and weeds.

Many farmers will undoubtedly resort to rotary type mowers for clipping in an effort to chop up and scatter the debris rather than to allow it to lay in the swath. Spurrier advises clipping only to control weeds and prevent field fires. Long, dry grass is a dangerous fire hazard. To aid in wildlife conservation it is best to wait until after the bird hatching season before clipping.

LETTERS

(*Continued from page* 12)

moon's effect on his crop. He said they always felt if they got 3 full moons on a tobacco crop it helped a lot. (It's a quick crop, you know, and wouldn't hit 3 full moons unless planted just at the right time.)

There is a prevalent belief we always have a late cold spell at Easter. Easter is a movable date, so how could that be? But those who believe that say, "Look, Easter is geared to the moon. There is always a full moon about then."

The old-timers I've talked with stick by their guns. They point to the tides as physical evidence of the moon's effect on earth, and to the 28-day sexual rhythm in mankind, identical with that of the moon.

Science has long scoffed at the moon as affecting planting time, castrating an animal, killing a hog, cutting firewood, etc. But the old-timers have believed in it since recorded history began, and almost up to our time. With anything so grounded in tradition, it is a wonder some research foundation, private or public agency hasn't made a sufficient study to find out. The idea of the moon affecting such things is thrown aside as mere ignorance, a superstition. And maybe it is. But I haven't found anyone who really knew.

J. M. Eleazer
Extension Information Specialist
Clemson, South Carolina

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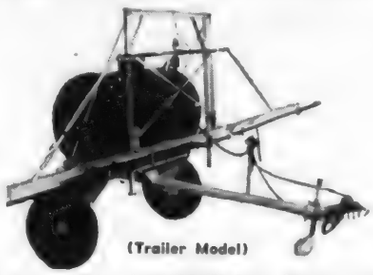
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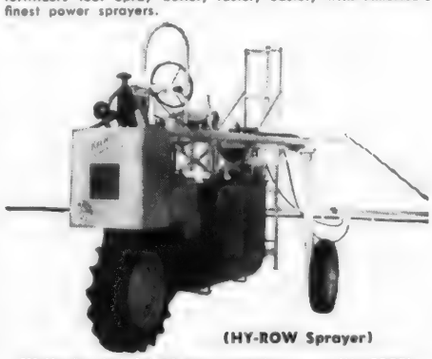
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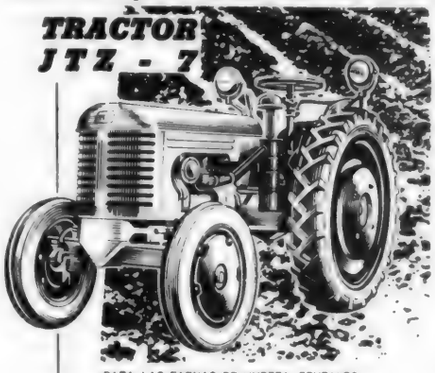

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backward as it does forward which just goes to show what happens when engineers let their politics get mixed up in their designing.

Charles Layford

La Junta, Colorado

It's a Habit

Sirs:

In your article on cow habits it said that a cow was never seen to spit anything out. I am afraid I have to disagree with you. We used to have a peach tree in our pasture and I had a cow who would eat a peach and spit the stone out. I don't know if the other cows did or not. I don't remember.

Samuel M. Henry

Robensonia, Pennsylvania

Who Knows?

Sirs:

Your article on Cow Habits was interesting and timely. There are lots of habits, quirks, quiddities, and quoddities of the cow we don't even inkle. More of these should be written about.

But the thing that gets me in this nuclear era is the almost complete ignorance on the part of ruminant nutritionists of ruminant digestion. Only a year or so ago I made an effort to find out what part each of the various "stomachs" of a cow played in digestion. I wrote a form letter to more than a dozen recognized agencies in the field and got replies from five. None of them had any information to offer.

These authorities could not say whether a cow could send food to the reticulum or rumen at will. They could not say whether a cow could live on finely ground concentrates—no fiber—or whether, if such ration were fed it would go to the rumen or to the reticulum or both. They could not say how and when the food went from the reticulum to the omasum and abomasum; under what conditions or what digestive juices acted where.

All in all I think this is sort of something. I wish you could stir up something about this situation.

M. J. Plice

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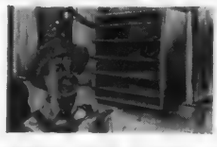

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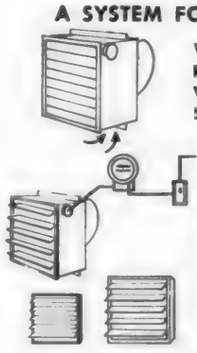

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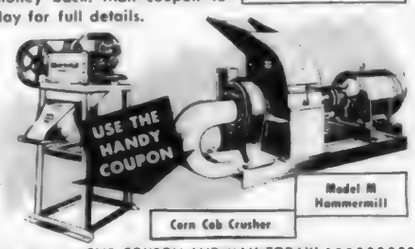

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FARM BOOKS

(*Continued from page* 32)

most farm management books contain a chapter or two on the problems of the tenant-operated farms, this full volume on the subject fills a very real need in agricultural literature today.

The book is filled with very useful examples of documents such as application forms, leases for both crop and livestock operations, budgets, and records which should prove valuable to any landlord—or any tenant for that matter. These documents, as well as the management techniques described by the authors, have been worked out by Iowa State College in managing the 12 Iowa State College Agricultural Foundation farms, all of which are tenant-operated. The senior author, Wallace, has been responsible for the management of these farms for the past 18 years; Beneke, the second author, has been in charge of the teaching of farm management to undergraduates at Iowa State College. Though the experience of the authors has been mainly in Iowa, their methods should prove valid in any part of the country.

Unlike most books on agriculture today, *Managing the Tenant-Operated Farm* was not written as a classroom text. It was written for farm owners, investors in farm property, and farm managers; if it should prove useful as a college text, so much the better.

THE FARM'S PICTURES

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Tree Talk

by

Will Rusch

Well, here we are with our first Tree Talk column which will be seen regularly on these pages from now on. If you own a woodlot or just have some trees on your farm, this column is written for you . . . we hope you'll find enough items of interest here to make you a steady reader.

Of all the farm programs and movements which have started during the past 15 years or so, the most encouraging, we think, is that of Tree Farming.

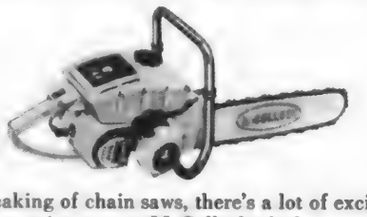
It wasn't too long ago that many folks, including some of this country's leading economists, were predicting dire things for the future as a result of the wholesale cutting of our timber resources. Some of these men, in fact, went so far as to claim that we'd be fresh out of lumber by 1975!

This kind of thinking has been pretty well dispelled in recent years, though, thanks to the rapid growth of the Tree Farm movement sponsored by the American Forest Products Industries. From a small handful of Tree Farms when the idea of planned woodlots was born in 1941, the number has grown to more than 8,400 – and the trend is still up.

There's an awful lot to be said (from a profit standpoint) for the program being carried on by the American Tree Farm system. In fact, we know of several men who've made more than $8,000 a year from tree farming alone, while still using much of their land for other crops.

Just as Tree Farming has grown, so has the popularity of the gasoline-powered chain saw during the past few years. We remember back a couple of summers when about the only people using chain saws in their work were lumberjacks.

That was before the McCulloch people introduced their complete line of chain saws which made it practical and *profitable* for anyone with just a few acres of land to own one of these handy tools.



Speaking of chain saws, there's a lot of excitement going on at McCulloch dealers everywhere right now. Seems their newest model, the D-44 *direct drive* saw, is catching on like wildfire – and no wonder!

We used the McCulloch D-44 just the other day for cutting some firewood, and we were pleased as can be with the way it zipped through the chore. It's very light, exceptionally well-balanced and literally self-feeding as it slices its way through small and medium sized timber. It really cuts with a light touch!

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OVER THE BACK FENCE

(*Continued from page* 28)

a buffalo (bison) bull and a Brahma cow. He was raised by the Circle K Ranch, Colony, Okla. He weighs 3,140 pounds, is 16 years old, and has been touring the country making appearances at fairs and exhibitions.

Somewhere along the line this French cow didn't get enough vitamins or minerals and look at what a monstrosity she turned out to be. Let that be a lesson. The picture came from our colleague in the French farm field, "La Revue de L'Elevage," Paris.

If anyone wants to see a Longhorn, alive that is, they had better look quick, for the breed is dying out.

This old boy, with a record wing-spread of 6 feet, died recently at the ripe age of 22. He was a throwback in the Longhorn herd on the Jim T. White ranch at Stowell, Texas. Horns of a Longhorn steer were usually larger than on a bull or cow.

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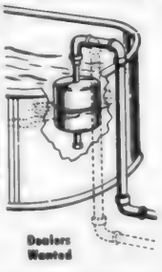

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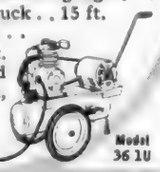

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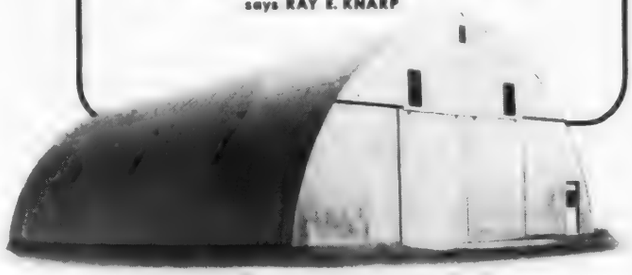

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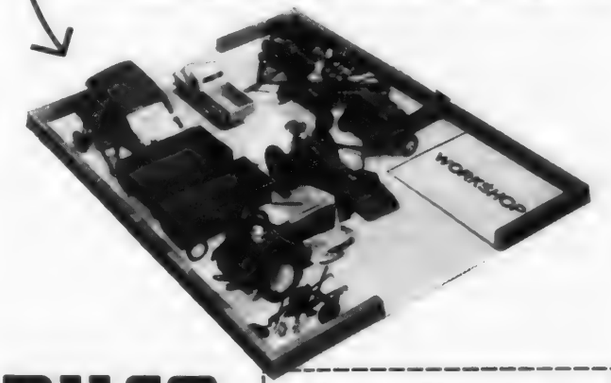

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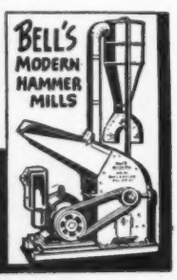

The **C. S. BELL CO.**
Manufacturers
HILLSBORO, OHIO

The photograph was taken by Monk Vance, of the information office, Texas A. & M. College, College Station, Texas.

This two-headed calf, now grown to young steerhood, is being exhibited at carnivals and fairs in Europe and North Africa. It eats from either mouth, but having only one windpipe and one voice box cannot bawl a duet. It was born near Tripoli, Libya, about three years ago.

It's Not No Joke A friend of ours went to the Soil Bank people to place his wheat land in the bank. He was asked if he had a drill. He said his wheat had been custom planted, he had no drill. Their answer was "We can't let you plant no wheat; you ain't got no drill." He said he knew where he could get a second-hand drill that would do the job not required. So he got his check. Now will someone help us figure this out?

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC., OF THE FARM QUARTERLY

Published quarterly at Cincinnati, Ohio, for October 1, 1956. Required by the Act of Congress, August 24, 1912, March 3, 1933, and July 2, 1946. Publisher—F & W Publishing Corporation, Cincinnati, Ohio. Editor—R. J. McGinnis, Cincinnati, Ohio. Managing Editor—Grant G. Cannon, Cincinnati, Ohio. Business Manager—Aron M. Mathieu, Cincinnati, Ohio. Owner—F & W. Publishing Corporation, Wilbert Rosenthal, James Rosenthal, Aron M. Mathieu, all of 22 E. 12th St., Cincinnati, Ohio. There are no bond holders, mortgages, or other security holders. Sworn to and subscribed before me this 24th day of September, 1956.

(Signed) Aron M. Mathieu, Business Manager
(Signed) Clifford Laemmle
My commission expires October 5, 1957.

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Have YOU Grown Moreton Hybrid?

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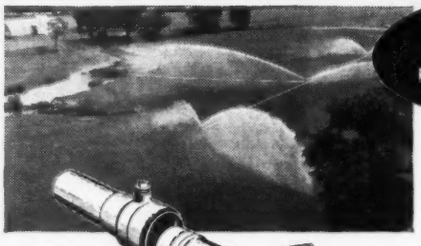

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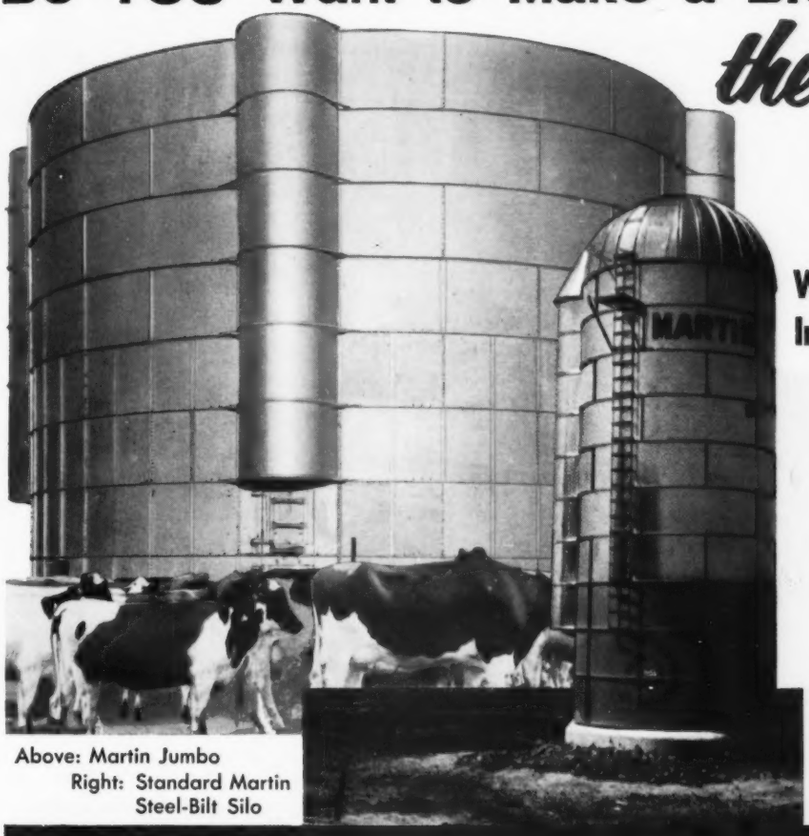

Above: Martin Jumbo
Right: Standard Martin Steel-Bilt Silo

the MARTIN *System*

Will Cut Your Labor Costs in Half— Increase the Value of Your Crops 25%

The key to a profitable beef or dairy feeding program is the use of a heavier ration of good quality silage. You can get more totally digestable nutrient from an acre—and slash labor costs in both handling and feeding to put more cash in your pocket. MARTIN Jumbo user Lawrence Begg, of Columbus Grove, Ohio, says that 15 minutes pitching morning and evening puts around-the-clock, free choice silage before 60 Holsteins. "With our MARTIN Jumbo we've solved the problem of saving time and work in feeding silage," says his herdsman, Lyle Graham. Regular or Jumbo, MARTIN Steel-Bilt Silos give proper fermentation for better quality, succulent, palatable silage.

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In addition to the buildings pictured here, MARTIN builds many other farm buildings. Write or phone about any special building problems you may have.

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Your best building buy today is this good-looking, fireproof, comfortable structure that lets you use every foot of space you pay for. The average MARTIN Rigid Frame Building costs less than a new car!

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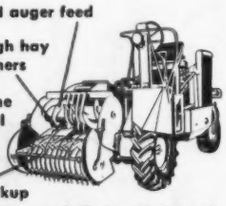
SEE THESE UNI-BALOR ADVANTAGES:

- **Controlled auger feed**
- **Straight-through hay travel. No corners**
- **Exclusive twine tension control**
- **Big, 4-foot pickup gets all the hay**
- **Full size 14x18-inch twine-tied bales**



Now, the same basic machine that gives you self-propelled windrowing, forage chopping, combining, corn picking, or corn picking-shelling, does your hay baling, too, to make MM Uni-Farming a still *better* way to farm! The all-new Uni-Balor for the champion Minneapolis-Moline Uni-Farmor takes this self-propelled system a big, new step ahead!

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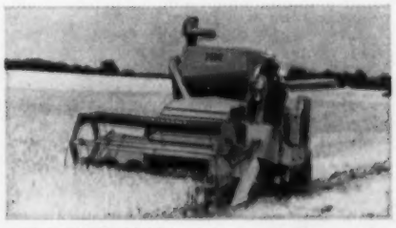
Ask your MM Dealer to show you how Uni-Farming—with one Uni-Machine or a fleet—can pay you better than any other farming method.

UNI-WINDROWER—Open fields anywhere, cut hay or grain as crops ripen. Big, 10-foot capacity with hydraulic height control and constant cutting speed.

UNI-FORAGOR—Uni-Farmor capacity in the lowest-priced forage harvester on the market! Now with interchangeable direct-cut, row-crop or windrow pick-up headers.



UNI-HARVESTOR—Self-propelled operation *plus* famed MM Harvestor performance! Available with hydraulic-controlled 9-foot header or windrow pick-up.

~~DISCOVER HOW~~ NOW YOU CAN GO TOO 100%

SELF-PROPELLED IN EVERY CROP AT FAR LESS COST THAN PULL-BEHINDS!

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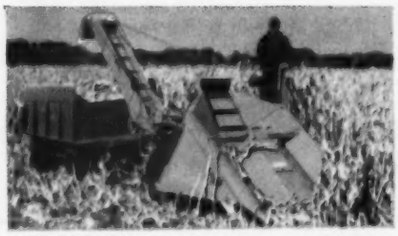

UNI-HUSKOR—The champion corn picker, in major competition and in your corn! Offers MM's exclusive husking bed with rotating and side-to-side action.

UNI-PICKER-SHELLER—Picks and shells corn with up to 30% moisture content in one trip through! You get the picking advantages of the Uni-Huskor and MM Shelling, too.

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